**SALES AND INVENTORY MANAGEMENT  SYSTEM**

Submitted by:- **Anjali**

University Roll no – 1900290149017

Submitted in partial fulfilment of the

Requirements for the Degree of

**MASTER OF COMPUTER APPLICATIONS**

Under the Supervision of Submitted To BRAIN TECHNOSYS

Submitted to

DEPARTMENT OF COMPUTER APPLICATIONS KIET Group of Institutions, Ghaziabad Uttar Pradesh-201206 (JUNE 2021)

DECLARATION

I hereby declare that the work presented in this report entitled “Sales and Inventory Management System", was carried out by me. I have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute. I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

I affirm that no portion of my work is plagiarized, and the experiments and results reported in the report are not manipulated. In the event of a complaint of plagiarism and the manipulation of the experiments and results, I shall be fully responsible and answerable.

Name : Anjali

Roll No. 1900290149017

………………………….

**CERTIFICATE**  Certified that **Anjali**(Roll no 1900290149017) has carried out the research work presented in this report entitled “**Sales and Inventory Management System**” for the award of **Masters of Computer** **Application** from **Dr. APJ Abdul Kalam Technical University, Lucknow** under my supervision. This report embodies results of original work, and studies are carried out by the student herself and the contents of the report do not form the basis for the award of any other degree to the candidate or to anybody else from this or any other University/Institution .

Date: Anajli University Roll No. 1900290149017

Date: Department of Computer Applications KIET GROUP OF INSTITUTIONS, GHAZIABAD

Signature of Internal Examiner :

Signature of External Examiner:

**ABSTRACT**

The retail business vision is to maximize profit from customer satisfaction and  loyalty towards the store by providing more personalize service for the customer.  However, retail business also easy to lose its possible customer if they do not have  sufficient stocks in the store. Thus, in this paper, the developer had identified problem related with inventory that exists in a one of oldest retail store in Delhi as  Anjali Store. The major problem of the store is they do not have proper inventory  control system in guiding and managing their sale and inventory level of the store.

By proposing Sale & Inventory Management System to the store as the  replacement of old manual ways, the project aims in providing system with enhanced and  more flexible functions to the store. The objective of the system is to provide functions in  managing goods in the store more efficiently. In order to achieve the objectives derived,  the scope of the project will focus on the aspects such as database, report generating,  quality control (QA) and point of sale of the store. Besides, the development of system  will be based on offline system or window based.

In developing the system, phase development prototype is chosen. This  methodology wii perform the development stage in according to modules underlines in  the scope of the project. Thus, version by version of the system will be developed before  the whole complete system is ready to use. The expected result of the system is that the  user interface to be developed will be user-friendly so that it can be handle easily by  people with no IT background. Besides, the system is also expected to serve its functions  and helps Rahmath Store in reducing time and paperwork in managing their inventory.

**ACKNOWLEDGEMENTS**

Firstly, I would like to thank God for giving me the chance to be able to engage in this  project. With Him, all things are possible.

Secondly, I would like to thank my supervisor Dr. Ajay Kumar Shrivastava, Professor and Head, Department of Computer Applications,, he has  been a great help in providing guidance and direction to where this project should lead  while giving valuable comments on work done.

Besides, I would like to thank the owner of Anjali Store for helping me in completing  the project.

Last but not least, I express my gratitude towards BRAIN TECHNOSYS and Team Member who have  directly or directly contributed toward the successful execution of this project.

TABLE OF CONTENTS

**CERTIFICATION………………………………………….3 ABSTRACT...................................................................................5 ACKNOWLEDGEMENT……………..……………………6**

**TABLE.CONTENT**.................................................................. **FIGURES**........................................................................................**10 CHAPTER 1: INTRODUCTION**

1.1 Project Background....................................................................11 1.2 ProblemStatement...................................................................1.2.1 ProblemIdentification…………………………………………121 Significance of the Project …………………………………131.3 Objective....................................................................................13 1.4 Scope........................................................................................14 1.5 Research…………………………………………………...14 1.6 The Relevance…………………………………………………….15 1.7 Feasibility of the Project within the Scope and time Frame..........................................................................................15

**CHAPTER 2: LITERATURE REVIEW**

2.1 Sales and Inventory Management System: History and Concepts......................................................................16 2.2 2.2Assessing the Benefits of the Barcode Technology...................................................................18

2.3 Advantages of Sales and Inventory Management System.....................................19 2.4 Point of Sale (POS) Concepts .........................................................20

7

**CHAPTER 3: METHODOLOGY**

3.1ResearchMethodol…………..........................................21 3.2 ProjectPhases..................................................................................23

3.3Method’sDataCollection.............................................................23 3.4Tools,Mechanisms,andSoftware .................................. ……..24

3.5ProjectDeliverable...................................................................... 3.5.1Gantt,Chart……………………………………………….25 3.5.2Key,Milestones…………………………………….….26 ..............................................................................................27

3.6.1Interviewand,Observation………………………………….27 3.7Planning......................................................................................29 3.7.1System.Request……………………………………………..29 3.7.2FeasibilityAnalysis…………………………………………30 3.8Analysis………………………………………………………32 3.8.1NonFunctional.Requirements……………………………...32 3.8.2FunctionalRequirements……………………………………33

**CHAPTER 4: RESULTS AND DISCUSSION**

4.1 The Framework of System..............................................................................34 4.2 FunctionalModel.............................................................................35

4.3PrototypeApplication..............................................................42 4.4SystemTesting………………………………………………...52

8

**CHAPTER 5: CONCLUSION**

5.1Conclusion..................................................................................58 **REFERENCES**.............................................................................59

**APPENDICES**..................................................................................................................61

**LIST OF FIGURES**

1. **Figure1:PhasedDevelopment-based mathelogy…………24**
2. **Figure.2:Gantt.chartofProjectMainActivities………..…25**
3. **Figure Key Milestones on project activities………………34**
4. **Figure 4: Framework of the system…………………………………………...35**
5. **5. Figure 5: Activity Diagram of Point of Sale…………………………………..36**
6. **6. Figure 6: Activity Diagram of Finance Update……………………………….37**
7. **7. Figure 7: Activity Diagram of Inventory Update……………………………..39**
8. **8. Figure 8: Use-Case Diagram of Sales & Inventory Management System…..41**
9. **9. Figure 9: ERD Diagram of Sales & Inventory Management System……….42**
10. **10. Figure10:User.Login.Page………………………………….43**
11. **11. Figure 11: Content Page (Admin View)……………………………………….44**
12. **12. Figure 12: Point of Sale Page…………………………………………………..44**
13. **13. Figure 13: Payment Page………………………………………………………45 14. Figure**
14. **14: Customer Receipt…………………………………………………..46 15. Figure**

**15:Notification meanu…………………………………..47**

**16:Notifications page ……………………………………48**

1. **17: Inventory Page……………………………………………………..49**
2. **18. Figure 18: Product Add /Edit Page……………………………………………50**
3. **19. Figure 19: Confirmation Message……………………………………………..51**
4. **20. Figure 20: Report Page…………………………………………………………52**
5. **21. Figure 21: Satisfaction on Interface…………………………………………...53 22. Figure**
6. **22: Effectiveness of System…………………………………………….54**
7. **23. Figure 23: Reflection of System toward User…………………………………55**
8. **24. Figure 24: Respond toward Generated Report ………………………………56**

10

**CHAPTER 1**

**INTRODUCTION**

**1.1 PROJECT BACKGROUND**

The retail industry is one of the industries that is growing in fast pace where the number  of retail business keep on increasing from time to time in order to meet the demand from  consumers of specified areas. There are different types of retail shops available for  consumer to choose ranging from hypermarket to mini market according to their  convenience. Most of the shops can be found in residential areas, streets, or in a shopping  mall. Basically, retail store sells wide range of goods and services from wholesaler or  supplier to the end-user. Thus, the nature of retail business required a good management  of inventory level in order to meet the demand of the customers.

The traditional way retailer keeps their sales and inventory details is in spreadsheets  which are not effective anymore when the size of the shop gets bigger. This is because  more items will be made available in a larger quantity, thus tracking the sales made with  inventory level in the shop would be complicated and time consuming for the retailer.  Besides, the situation gets worst when the retailer does not have proper method to  determine items purchased by their customers.

Thus, this project will provide solution for retailers that are still using traditional  way in keeping their inventory data like ‘Rahmath Store’ in Taman Maju, Tronoh by  creating inventory system.Sales and Inventory Management System is a computer- based  system that provides the shop structure for maintaining and controlling goods to be  stocked. The approach of Sales and Inventory Management System is commonly used to  avoid product overstock or outrages by integrating daily ‘Point of Sales’ with store’s  inventory level.

11

**1.2 PROBLEM STATEMENT**

**1.2.1 Problem Identification**

Inventory is one of the important departments that must be well managed in order  to ensure daily business activities run smoothly. However, Anajli Store still does not  realize the important of inventory management as they are not equipped with  computerized system in running their business. As a result, the security level of all data,  documents and anything that related to daily transaction and inventory is very low. A lot  of documents have been keep for each goods and for each supplier which consume a lot  time and not effective for future references. In addition, due to poor sales and inventory  management, Anjali Store also face problem in identifying the quantity sold for each  items per day and available inventory level of the items. Existing inventory management  also does not provide any means in detecting expired date for food based products such  as milk, bread, flour and etc. Failure to identify the expired date of certain products  causes the store to incur losses on those items.

As current system used just acts as calculated to calculate the total amount of each  customer purchases and does not any database link with it, the system does not have the  capability of generating report on point of sales at the end of the day. Thus, there is no  proper guideline in making reports in the store’s log book which result in different kind  of reports being prepared each time. The simple report which is about the total sales of  the dayis determined based on amount of money in the cashier deck does not provide any  input for the owner to make the right decision regarding the business operation.In case of  there is short of cash in the cashier desk or any stolen cases, the owner cannot detect it as  the current system does not have database to store the total sales of the day.

Another identified problem is that the customers who made their purchases at the  store usually do not receive proper receipt as references. Instead only receipt contains  prices being generated by the system. Thus, customer face problem when they wanted to  change the items bought due to damage, expired or wrongly purchase as the receipt does not indicate the name of items which makes it hard for the customers to prove that they  bought it within 3 days in Anjali Store.

**1.2.2 Significance of the project**

This new system that will be developed will contain database that enable data  storage and retrieving of each transactions and data about inventory of each items in the  store, manage the product releases and storage and summarize point of sales. This would  generate a faster improvisation of work with less time and effort. As the concept of Sales  and Inventory Management System is to reduce paper works and ineffective ways of  managing inventory, this system is expected to assist in making the right decision in the  process of managing inventory aligned with the sales level in the store.

**1.3 OBJECTIVES**

As the available existing system provides limited functions to the user, thus this  project will contain enhanced and more flexible functions to the store. The objectives  include:

i. To provide function to manage goods in the store more efficiently. Basic  functions such as ‘add’, ‘delete’, and ‘update’ for data management will be made  available.

ii. Filling system in managing all transactions and documents that are relevant as the  aid in the stock tracking routines.

iii. To automatically generate weekly report on sales and inventory activities iv. To provide notifications on the goods’ expiring date for clearance activity. v. To generate receipt with proper format for customer references vi. To provide point of sales for each day

vii. To reduce time and cost to control and manage inventory

**1.4 SCOPE OF STUDY**

Within the boundary of this project, the system aims in having the following aspects:

∙ Database - has two parts in it, temporary transaction database and master  database. The data in a master database will be updated according to the temporary  database at the end of each day.

∙ Report- generates daily and weekly report to know the number of inventory in the  products.

∙ Quality control (QA) - is to check the expired date of the products. ∙ Point of Sales- facilitate the transaction of each custo me The development of the system will be based on offline system or window based system  which does not require any internet connection to operate it. In order to implement the  system, the first thing is to collect information about the products and requirements from  the owner to see the feasibility of developing the system for Anjali store. Then the  process of idwdentifyingthe methodologies and tools to be used will takes place in the first  half of the project. Together with that, the interface of the system also will be developed.

The second half of the project will be mainly on implementing and testing the system  until it is completed. It is estimated to take around 8 months to complete this project.

**1.5 RESEARCH LIMITATION**

Due to time constraints, the project has the following limitations:

∙ Lack of new request status checking

The system does not provide any means in checking request for new products and this  makes the requesting process incomplete where the user have to check it manually.  ∙ Lack of decision support element

The system does not analyze the data in capture in the database such as provide the  patterns of customer buying behavior to the user but just have the capacity of retrieving  the data in the form of report.

**1.6 THE RELEVANCY OF THE PROJECT**

Sales and Inventory Management System is relevant to Rahmath Store as the store  offers wide range of household products to the customers around Taman Maju areas. In  fact, Rahmath Store is the oldest groceries store in the area of nine years operation and  they also had opened up new branches to gather growing customers. However, until now  they does not use any computerized system in helping them with sales and inventory  control. That explains the needs of having systematic inventory control system.

Increased proper management of inventory and efficiency are the main target of system  which will overcome the weakness of the current manual ways of doing business.

**1.7 PROJECT FEASIBILITY WITHIN SCOPE & TIME FRAME**

Time and scope are interrelated constrains in a project development. In  development the system, the scope has been narrowed down to only inventory control  through daily sales and this has given the developer enough time to conduct preliminary  research and develop the project. Research will be conducted only regarding Anjali   Store sales & inventory system and within the time frame, it is believed that can be done.

Research also includes analysis on the literature review for the developer to understand  subject domain in detail with realistic time frame. Besides, experienced gained in  handling sales & inventory system from part-time job in retail store known as ‘100 Yen’  is very helpful in understanding the scope. It is estimated that preliminary research will  take roughly three months and system development will take about four months. Keeping  the project focused and having clear framework are important in minimizing the failure  risks of the project.

**CHAPTER 2**

**LITERATURE REVIEW**

**2.1 SALES AND INVENTORY MANAGEMENT SYSTEM: HISTORY AND  CONCEPTS**

Each day, millions of people take part in countless sales transactions across the globe,  creating a constant flow of value which forms the backbone of our economies. In general,  sales mean a transaction that takes place between two parties where the buyer receives  goods (tangible or intangible), service or assets in exchange for money. Thus, the process  requires each party to give up something in return for something valuable for them. On  the other hand, inventory means the raw materials, work-in-process goods and finished  goods that are considered to be the portion of a business’s assets that are ready for sales.  This explains that, business needs inventory available to make sales to the customer in  return for money which will generate the profits.

There are two kinds of problem that are faced by business in managing inventory level  which are high inventory and low inventory. Holding a high level of inventory for long  periods of time is not usually good for a business due to costs incur for inventory storage,  obsolescence and spoilage. On the other hand, low level of inventory is not good either as  the business may face the risk of losing potential sales and potential market share as well.  In an attempt of resolving inventory problems, the solution lies on efficient inventory  management.

Tim Crosby (2012) in his study on ‘How Inventory Management Systems Work’ stated  that inventory management system are the rule in knowing which products are selling and  which are taking up shelf space for enterprises as well as smaller businesses and vendors.  The system balance the goal of ensuring customers always have enough of what they  want against a retailer’s financial need to maintain as little stock as possible (Tim  Zierden,2009). Thus, the ability to track sales and available inventory, communicate with

16

suppliers in near real-time and receive and incorporate other data such as seasonal  demand must available in the modern inventory management systems .

According to Anton Dolin sky(2010) on his article about ‘Barcodes, sales and inventory  control’ stated that in the earliest days of inventory keeping, in order to forecast future  needs, the merchants wrote down purchases or looked down at how many units were  gone at the end of the day. However, this practice seems to be difficult to carry out after  the Industrial Revolution as the mass production became the main goals of business  together with improving customer experiences at the point of sale. In the early 1930s, a  team from Harvard University designed the first modern check-out system that used  punch cards that corresponded with catalog items. In 1960s, the emerged of affordable  laser technology development brought hope in reviving the concept. Then modern bar  code or Universal Product Code (UPC) was born and caught on just before the 1970s. As  a result, the power of UPC codes to help track and manage inventory improved  exponentially when the computing power became better at the same time.

As the technology development advance, another new technology for inventory tracking  has made its way into stores, warehouses and factories in recent years (Edward A. Silver,  2007). Radio frequency identification (RFID) uses a microchip to transmit product  information to a scanner or other data collective device. Thus, the constant ‘beep,  beep,beep’ of bar codes being scanned at the check-out lane represents the modern  inventory management systems of stock tracking.

**2.2 ASSESSING THE BENEFITS OF THE BARCODE TECHNOLOGY**

Among data capture technologies that have been widely used in almost every industry is  the bar code system as stated by EvrenSahin& Yves Dallery (2010), in their research  paper on ‘The Impact of the use of Bar Code Technology on Supply Chain Operations’.  The grocery industry for example was able to realize the hard and soft savings of 2.67%  and 2.89% respectively of the revenue by leveraging the barcode industry. Reduce the  data capture errors, the capture of timely data for inventory control, an enhanced  communication between buyers and sellers and the improvement of customer service are  the typical goals in using the barcode system. Besides, the system allows businesses to  monitor operations, manage resource and also to flag anomalies before they impact  throughput by acting as the major source of real-time feedback.

How supply chains can benefits from barcode applications have been studied several  times. One of the researches includes the qualitative research that explains the concept of  the bar code technology and develops conceptual methods in an effort to better  understand it. Based on case studies carry out in distribution and manufacturing  companies, barcode system play an important role in enhancing inventory management  performance. Results that shown by the studies are less capital tied up in inventory,  enhanced inventory control, enhanced customer service and empowered employees. The  integration of inventory and marketing information system using barcode technology is  an enabler for effective supply chain.

From the studies, it is proven that Anjali Store should leverage on the technology in  order to gains from the benefits. By using barcode technology, Anjali Store will be  able to control its store inventory in more manageable manner and increase the customer  satisfaction by anticipating to the demand faster.

**2.3 ADVANTAGES OF SALES AND INVENTORY MANAGEMENT  SYSTEM**

As the advantages of switching to modern inventory control system clearly proven by  many businesses, it is the time for Store to start implementing it in their store to  see the differences will be brought to the store. In Donald Reimer (2008) in his study  with the title of ‘Computerization is the key in maintaining proper inventory levels’  identified few benefits as follows:

∙ ***Inventory management increases profitability***

Activities such as forecasting, controlling and managing inventory increase sales and  productivity of the store resulting in greater profitability. Besides, accuracy  improvements on the inventory level will result in reduction of fixing costly mistakes.  Spend management also will be improved as the system provide quick access to current  and historical pricing, cross-referenceable product codes and tools set for managing  purchasing activities (Zipkin, P.H., 2000).

∙ ***Inventory management improves cash flow***

Purchasing the correct inventory in the right amount to meet customer demand and at the  same time eliminating slow-moving, obsolete inventory leads to better cash flow and  eventually to higher profits.

∙ ***Inventory management improves decision-making***

Real-time business intelligence across all areas of the store is possible with rapid,  accurate data collection. Not only that, issues and events integrated with the system  enables to proactively identify and solve the issues.

∙ ***Inventory management increases customer satisfaction***

Anticipating in seasonal promotion and changing marketing conditions by having the  right products in stock for customers.

19

**2.4 POINT OF SALE (POS) CONCEPTS AND USAGE**

Tim Bajarin (Jun, 2013) writes on his article ‘*Bringing the Checkout Counter to  You’* that station or aisle where individuals transport and place products they have  chosen to purchase from the location is a checkout counter or cashier stand. The typical  process that occurs at checkout is that cashier scans and rings up each item on the cash  register and obtains the total. The transactions at the checkout are process using POS  system that the retail store adopts according to its needs. According to Kaplan, Karen in  his article on Los Angeles Times entitle of "Do-It-Yourself Solution: Small Grocery  Chain Has Big Plans for Its Retailing Software", stated that POS term is applicable for a  retail shop or store, the checkout counter in the store where transactions between  customer and store can occur.The term Point of Sale is often used in connection or  relative with the hardware and software for checkouts POS systems are being utilized in  many different industries since its technology merge ranging from restaurants, hotels &  hospitality businesses, casinos, salons and as well as retail environments.

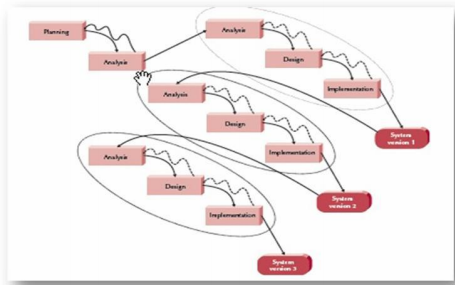
Currently, most of retail POS Systems were the most sophisticated, powerful and user  friendly computer networks in commercial usage. Moreover, the POS systems carry out  more than just POS tasks where POS solutions available that include fully integrated  accounting, inventory tracking & management, open-to-buy forecasting, customer  relation management (CRM), service management, rental services, operation reporting  and payroll modules (Quorion,2011). POS software is as only good as its integration with  the many different popular software and services nowadays. For example accounting  programs, where all of the daily activities and transactions would automatically imported  into accounting without any labor input.

**CHAPTER 3**

**METHODOLOGY**

**3.1 RAPID APPLICATION DEVELOPMENT (RAD) METHODOLOGY**

In developing the system, author chooses to use one of ‘rapid application  development (RAD)’ – based methodology categories in ensuring smooth user and  developer with different IT background. RAD- based methodology allows in adjusting  the SDLC phases in getting some part of the system being developed quickly and into the  hands of the users. In this way, the users can better understand the system and suggest  revisions that bring the system closer to what is needed.

https://lh4.googleusercontent.com/zP4XgVcN7e86RIIT1pxn1-vaao5ZeCJMK6AY5jgdTTKyF9JyKECSgFhCU43_K4K4i3JwXLIXf0JAdvwInkrNWKBdmN7-sFyOtNkJcoiwuC0SkmtL2YZFC-K-mEfylmrnUNyfNDoY**Source: *Taken from (Dennis, Wixom, & Roth, 2006, p. 14)***

***Figure 1: Phased Development-based Methodology***

As the system contains many module binds together to work as a complete  application, phased development- based is the best methodology to anticipate this  problem where it breaks an overall system into a series of versions, which are developed  sequentially. Thus, system prototype will be developed based on one module after  another. The analysis phase identified the overall system concept then categorizes the  requirements into a series of versions. Besides, visibility of layout in window based  application is one of critical part. This allow author to identify navigation and usability  problems when developing one of the modules before spending a lot of time developing  the entire system completely. Once version 1 is implemented, work begins on version 2.  Additional analysis is performed based on the previously identified requirements and  combined new ideas and issues that arose from the user’s experiences with version 1.

The advantage of phased development- based methodologies of quickly getting a useful  system into the hands of users provides business value sooner to the user. Moreover,  because users begin to work with the system sooner, they are more likely to identify  important additional requirements sooner. These are some of the reasons why the author  chooses this methodology for development process.

**3.2 PROJECT PHASES**

There are basically four phases in the project activities which compriseof:

***i. Planning:***

- The problem faced by chosen shop is identified and the solution is proposed - The objectives and scope of project are defined clearly

- The project activities are planned according to the time frame

***ii. Analysis:***

- Data is gathered and analysis on literature are done

- Interview session with Anjali Store are conducted for requirements collection  purposes

***iii. Design:***

- Project model and prototype are designed

- UML diagrams are designed

***iv. Implementation:***

- Coding of project is initiated until the system is completed

- Testing is carried out to test the usability of the project

- Make it available for the user

**3.3 DATA COLLECTION METHODS**

In the first part of the project, research and gathering information play a role. Two  research methods used in the project are:

**i. *Interview*** : conducting interviews with the owner of Store to see  whether the system is useful for them as well as gathering information on the  requirements of the system

**ii. *Searching on the Internet***: basic information about existing Sales and Inventory  System and how to develop inventory tracking system in general.

**3.4 TOOLS, MECHANISMS AND SOFTWARE**

In the second part of the project, tools that are used to develop the system are as follows:

***i. Microsoft Visual Basic***

Microsoft Visual Basic is an integrated development environment (IDE) from Microsoft.  It is used to develop console and graphical user interface applications in both native code  and managed code for all platforms supported by Microsoft Windows, Windows Mobile,  Window CE, .NET Framework, .NET Compact Framework and Microsoft Silverlight.

***ii. Microsoft Access***

Microsoft Access also known as Microsoft Office Access is a database management  system from Microsoft that combines the relational Microsoft Jet Database Engine with a  graphical user interface and software-development tools. It is a member of the Microsoft  Office suite of application included in the Professional and higher editions. Microsoft  Access is used to develop application software and supported by Visual Basic for  Applications.

***iii. Online Project Management (Smartsheet.com)***

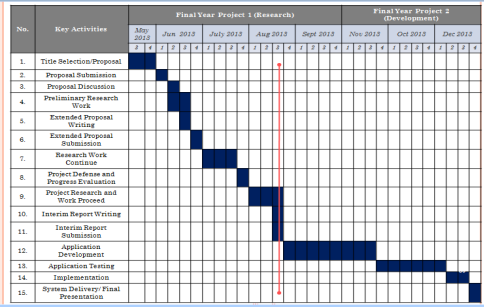
***iv. Diagram Tools (Draw.io)***

***v. Microsoft Project Professional Office***

24

**3.5 PROJECT DELIVERABLE**

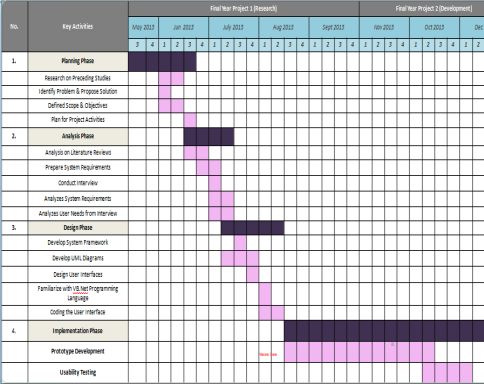
**3.5.1 Gantt Chart**

**F**

***Figure 2: Gantt chart of Project Main Activities***

25

**3.5.2 Key Milestones**

***Figure 3: Key Milestones on Project Activities***

**: Project Key Milestones**

26

**.6 PRELIMINARY STUDY**

**3.6.1 Interview and Observations**

**i. *Background of Interview***

Interview and observation had been conducted on 18th July 2013 at Rahmath Store in  Taman Maju. The interviewee is the owner of the Store who started the business nine  years back named Mr. Mohd. Rahmath Bin Kadir. He has 20 years of experiences in  doing retail business.

**ii. *Purpose of Interview***

▪ To uncover further problems regarding inventory management using manual ways ▪ To understand the current methods and approach being used in doing daily sales  transaction by the staffs

▪ To identify the main features or functionalities to be integrated into the project  prototype

**iii. *Summary of Interview Results***

▪ More than 50 types of goods range are available in the Rahmath Store. Most of it  is from food based products, stationary, medicine, newspaper and many more.  ▪ Due to wide range of products being offered to the customers, they are having  difficulties in handing their inventory.

▪ The main problem in their store is that they do not have any means in detecting  which products are moving out from the store. Thus, they have to check the  inventory manually or sometimes customers will notice that some products are  out of stock. This can cause loss for them as the possible customers could not get  the products they want and make sale at the store.

▪ Besides, they also could not keep track on expiring date of food-products based as  each products have different expire date. This also had cause the store to be stack  up with expired products.

27

▪ They also do not issue receipt to customers but rather a simple calculation the  total receipt. This means that they rely on the Rahmath price tag on the products  as the proof if customers wish to exchange the products.

▪ Current transaction method used is basically a machine that store moneys and  calculation the total sales of each customer.

▪ Even the machine do serve its purpose as calculator, however it fails to solve  inventory problem of Rahmath Store

▪ The performances of the store is viewed in a very simple ways by ignoring other  important aspects does not give them a clear vision in expanding the business  further.

▪ They also do not use any computerized system because they scared to change  their ways of doing business since long time ago. Besides, they also scared that  their workers do not know how to handle and use the system.

▪ Needs from Rahmath Store are taken into consideration and for further analysis in  solving the problem faced by the store.

28

**3.7 PLANNING**

An interview was conducted with Rahmath Store’s owner about his opinion on need of  Sales & Inventory Management System. The interview also hints about the proposed  system of how they would respond if system is available.

**3.7.1 System Request- Sales and Inventory Management System** ∙ **Project Sponsor**

The person who initiates the project is the owner of Rahmath Store and the workers  together with the owner serves as the primary point of contact for the project.

∙ **Business Need**

This project has been initiated to develop Sales and Inventory Management System to  provide a better way of inventory control and tracking therefore store can manage the  movement of goods more efficiently.

∙ **Business Requirement**

The system will be the first system used by Rahmath Store thus it will be made as offline  system. The system provides enables the owner to keep track on the inventory level of  each goods with presents of database. The functionalities that the system should have are  as follows:

✔ User log in

✔ Admin log in

✔ Process sales

✔ Update inventory database based on POS

✔ Generate report on Sales

✔ Notification on low inventory level

29

∙ **Business Value**

Author expected that with this system, the users able to process customer transaction  easily with minimal error or zero error. Furthermore it is going to be more efficient in  managing inventory and sales data because all data in available in database.

∙ **Special Issues or Constraints**

Rahmath Store needs to familiarize in using the new system in their day to day business  activities

**3.7.2 Feasibility Analysis**

**i. Technical Feasibility**

Technical aspect is the most important part in the system development. As the system is  offline based, visual basic will be used to develop the interface and the functions of the  database. For the database aspect, Microsoft Access will be used which will link the  system interface with the data storage.

The exposure gain in ‘Business System Development’ subject through course curriculum  has given the author the credibility to develop the program as specified. Moreover, online  tutorial on system development also vastly available on the internet which will helps  author in development stage.

**ii. Economical Feasibility**

Basic analysis has been done in investigating the economical feasibilities of the project.  The financial analysis demonstrates that the new system will reveals a positive economic  feasibility. In term of software designing and license, it can be found on open source in  the Internet thus, owner does not need to purchase the software from the vendor.

New system will be requiring extra cost on the hardware implementation part. Looking at  current situation of the store, the owner has to purchase a desktop to use the system and  also bar code scanner to scan the barcode of the products.

30

In term of special staff training, the new system will not need any extra cost. Normally,  newly develop system will need for special training for the user, however in this case the  system the handling part is very easy and eliminate the need for training. Besides, a  friendly interface makes staff work with less stress.

Even though initial cost of implementation is quite high, the owner will enjoy the benefits  of switching to the new system in a long term in term of efficiency and effectiveness of  business operation. Firstly, they can reduce the cost or the loss incur due to overstock of  food based products that have expired date. Secondly, the system also reduces the risk of  having products that out of stock in the store will eventually cause the customers to find  the products in other store. Besides, customers satisfactions also expected to increase as  the system will provide them with proper receipt for references upon implementation.

Turnover rate of each items reported by the system also helps the owner to make  appropriate inventory level decision of the item precisely. Apart from all the benefits,  costs related to manual works and documents required to maintain the inventory level  will be reduce and eliminated gradually as all the data will be stored in the database.

Even though initial cost of implementation is quite high, the owner will enjoy the benefits  of switching to the new system in a long term in term of efficiency and effectiveness of  business operation. Firstly, they can reduce the cost or the loss incur due to overstock of  food based products that have expired date. Secondly, the system also reduces the risk of  having products that out of stock in the store will eventually cause the customers to find  the products in other store. Besides, customers satisfactions also expected to increase as  the system will provide them with proper receipt for references upon implementation.

Turnover rate of each items reported by the system also helps the owner to make  appropriate inventory level decision of the item precisely. Apart from all the benefits,  costs related to manual works and documents required to maintain the inventory level  will be reduce and eliminated gradually as all the data will be stored in the database.

**iii. Operational Feasibility**

The risk of familiarity with the application is medium because the users/staff never used  to computerized system. Thus, there is a need for brief introduction on handing the  system in order to implement the system. Besides, as most of the staffs in the store are  not IT literate, the to-be system will be user-friendly and easy to operate.

***Administrator:*** The administrator will have easier access of inventory data and update  it. He prints out daily and weekly statistical report to check on the store business  performance.

31

***The Staff:*** The to-be system will ensure the transaction handle by them will directly send  to database. Thus, the staff will gain advantage upon the implementation of the system as  this can reduce the human-error by calculating the transaction manually and compare it with the amount of money in the cashier and the inventory level available.

**3.8 ANALYSIS**

**3.8.1 Non-Functional Requirements**

∙ **Operational Requirements**

The system is required to be operated in the computer. Since Rahmath Store does not  have one, they have to purchase in order to install the system. It has to be able to update  database based on point of sale of each customers. Moreover, the system can generate  daily, weekly and monthly report on sales performance.

∙ **Performance Requirements**

This system should not take more than 5 seconds to load information and it should not  delay more than 2 seconds for user respond.

∙ **Security Requirements**

Not all staff can access the system apart from the staffs that are responsible in processing  customers’ sale at the cashier. The sales information is confidential and only accessible  by the admin.

∙ **Cultural and Political Requirements**

No special cultural and political requirements are anticipated

**3.8.2 Functional Requirements**

∙ Log In

∙ Process sale

Allow user to scan items purchase by each customer. The system will display the  description of the items and process the total sales and generate receipt for the customers. ∙ Tracking inventory level

Admin able to track the inventory level of each items in line with the sales made.  ∙ Update database

Allow admin to update the inventory data in the database that will be used when  processing sale.

∙ Generate report

Reports on daily, weekly and monthly sales of the store will be generating so that the owner can view the performance of the business and take appropriate actions

33

**CHAPTER 4**

**RESULTS AND DISCUSSION**

**4.1 THE FRAMEWORK OF THE SYSTEM**

The users here include:

∙ Administrators of the system who can log in and modify the information of goods ∙ Staff who are responsible for processing sale

The system will include:

∙ A user friendly interface

∙ A database: to store all the information

The users will interact with the system through an interface by giving inputs. The input  then will then be processed by the system, giving the information needed by on the input  given. The system also stores the processed information from the user in the database.

**4.2 FUNCTIONAL MODEL**

***Activity Diagram of Point of Sale***

35

***Activity Diagram of Finance Update***

***Activity Diagram of Inventory Update***

Basically for proposed Sales & Inventory Management System have one main  activity diagram as shown in Figure 5 and leads to another two activity generated from  the main activities. The activity started with customer selects products and bring to  cashier for payment to start the sale for that transaction. The user will process the sale by  scanning the barcode of each items and system will retrieved the description and price of  items and present it on the Point of Sale. List of items also will be created and subsequent  items will be added into the list. Finally the total will be calculated by system and  payment will be received from the customers.

When payment is made, the transaction receipt will be print and given to the  customer. At the same time, another two activities will takes place upon the sales is done  which is updating the inventory and updating the finance part. As shown in Figure 6 the  finance part of the store is updated in the system by capturing the total sale made by each  customer. The update will take part on temporary table on daily basis before update on  main database at the end of day. On Figure 6, the inventory is being updated by capturing  the details of each transaction from each customer. Notification will pop up if the stock  level of the items is below the minimum level. This indicates end of activities that takes  place on the system operation.

***Use-Case Diagram of Sales & Inventory Management System***

It shows the use-case diagram which are graphical overview of the set of  use cases contained in the system. The diagram illustrates the main functionality of a  system and the actors that interact with the system. The diagram basically has three main  actors which are the users, admin and customers that derive value from the system and  the use case represent the functionality of the system. The functions that operate on the  front end basically handle by the use and the back end or information adding is done by  the admin. Customer present to support the function that links with user.

shows the Entity Relationship Diagram where its represent the database  that will be developed for the system. Each class will capture and store information that  will be used for the operation of Rahmath Store. Each class contains attribute that  describe the properties and state of the object. Some of the class also contains actions or  functions that the class can perform. The diagram also illustrates the relationship of one  class with another class.

**4.3 PROTOTYPE APPLICATION**

Sales and Inventory Management System is a window based application designed  to run on desktop. The application is designed in such a way even non-technical skills  people also can use it by simplifying the function in the application. Figure10 shows the  main page which is the login. The user and admin login will differentiate the functions  enable in using the application. Once login success, the users are will be directed to  content menu interface.

This is the homepage of the system. The users sign into the system using their ‘Username’ and  password. If they do not log in. they can’t use the system

shows the content interface for admin view. Admin are allowed to  choose all four functions on the menu page which are POS, Notifications, Inventory and  Report. However, for user login, only POS button is enabled due to security purpose on  store information.

***Content Page (Admin View)***

When admin click on the POS button it will lead to POS page as shown in Figure  12. In this page, sales ID will be display for each new point of sale. When user scans on  the product’s barcode, the details will be display on the table. When all the items done  process, the total will be display at the bottom of the page. Then the user must click on  thepayment button to finish up the transaction. Figure 13 shows the payment page that  will require user to key in total amount receive from customer and select the method of  payment either cash or credit card. The balance to be given to the customer will be  display on the page. The user then can click on the ‘print receipt’ button to be given to  the customers as references of purchases made. Figure 14 shows the examples of receipt.

***Customer Receipt***

Next, when admin click on the Notification module, the choice interface will be  display as shown in Figure 15. The admin can choose whether to view notification on  expiring product or product stock. If admin choose ‘Expiring Product’, next interface will  be load as shown in When admin select date, products that are expiring  prior to the date will be display. On the other, if ‘Product Stock’, the stock interface will  be display as shown in By clicking on the checkbox of product categories,  products that reach the min stock balance of the categories will be display.

The third module is the inventory modification. When admin enter the inventory  module, he will be directed to the interface where he can make changes as shown in  Figure 17. In this module, there three main functions namely add, edit and delete. If the  admin wish to add new item, then he must click on add button on the bottom of the page.  Then, add item interface will be load for the admin to key in details of the product as  shown in

In contrast, when admin wishes to edit the product, he has to choose  the item from the database first and choose edit button, then the edit page will display to  make any changes as Lastly, if want to delete the item, choose the item and  click on the delete button. Confirmation message box will be display to confirm the  deletion of the item as.

***: Notifications Page***

The third module is the inventory modification. When admin enter the inventory  module, he will be directed to the interface where he can make changes as shown in  Figure 17. In this module, there three main functions namely add, edit and delete. If the  admin wish to add new item, then he must click on add button on the bottom of the page.  Then, add item interface will be load for the admin to key in details of the product as  shown in Figure 18(a).

In contrast, when admin wishes to edit the product, he has to choose  the item from the database first and choose edit button, then the edit page will display to  make any changes as Figure 18 (b). Lastly, if want to delete the item, choose the item and  click on the delete button. Confirmation message box will be display to confirm the  deletion of the item.

***Invent***

The last module is the Report. This module will display report on the sales made  of the store daily, weekly and monthly basis. The report will be display in the form of bar  char that shows sales amount based on product categories. shows examples of  report on daily basis.

50 **SYSTEM TESTING**

System testing was divided into three parts, which are developer testing, user  testing and customer testing. The testing comes with the intent to ensure that the system  meets identified requirements stated in the early stage.

*A. Developer Testing*

The data enter by admin and user is stored in Microsoft Access database. Since  the transactions involve a lot of the database interactions, it is important to test the  performance of the database used. A group of 50 to 100 records of products were inserted  to measure the reliability of the developed database. Besides, the testing also involves  syntax, functionality and logical errors. No major problem found in this testing.

*B. User Testing*

This testing is done after the development of the software is completed. The users  were brief on how to operate the system and interact with the interface. The users’  comments appropriate to the system such as errors related to the software interface,  functionality errors, command structure and entry errors were recorded. It was done to  the selected target users which are the owner and staff of Rahmath Store. This testing was  done to compare the effectiveness of controlling inventory through POS using this  system.

The procedure taken in conducting the user testing as below:

∙ The users were divided into two groups namely SystemI and TraditionalI. The  SystemI were trained and instructed in using the Sales and Inventory Management  System to process sales using the system.

∙ SystemI group then attend to customer transactions using system while  TraditionalI users attend the customers using the current way. The total  transactions process in a given time period were captured in the testing.

set of questionnaire were given to the users to obtain information about their  satisfactions and the performances of using the system after the user completed  the testing. The users’ comments on the Sales and Inventory Management System  were recorded.

**on Interface**

8 

Location of Button Easy to Navigate Font

***: Satisfaction on Interface***

Figurillustrate testers toward the system interface. Users experienced the  system function and the interface. It is to identify whether the system is user-friendly.  The question includes the location of button, easy to navigate within the system and the  font used in the system. From the survey, it is viewed that most of the user are strongly  satisfied with the interface of the system with 8 to 7 respondents. These statistics support  the main objective of the project

53**Effectiveness of System**

10

**t**

***Effectiveness of System***

Figure 22 shows the result on effectiveness of system. Based on the figure above,  all user believe that the system make it easy to detect stock level. A total of 9 users say  that the steps clearly stated and easy to follow and 8 users say that by having the system,  error occur at POS can b **of System toward User**

10

***: Reflection of System toward User***

Another area being investigated is the reflection of system toward user. This is  important to see whether the system is really useful and needed when it is really launched  in the future. From 10 users, 9 believed that the system would benefit them and the store.  Next, all users very agreed that they will definitely use the system when it is really  deployed. From these statistics, majority of the users support the implementation of the  system. It is proved that the system really needed and welcome by the users

***Respond toward Generated Report***

illustrate the users respond toward generated report produced by the  system. About 8 users believed that the report generated by the system is very helpful and  a total of 9 users believed that the report produced by the system is applicable in doing  further decision on the product promotion in the real world.

*C. Customer Testing*

On customer, testing is done to get their feedback on the new application of sales  system. Basically they are given set of feedback form on how they rate the performance  and speed of processing the transaction at the counter using the system. Besides, the  satisfaction level of customers also taken into account during the testing.

**Customer Testing Outcome** 20

15

10

5

0

1 2 3 4 5 Performance Satisfaction

***: Customer Testing Outcome***

shows the result of the customer testing. The rating is from scale of 1-5.  Rating 1 signifies strongly agree and 5 signifies strongly disagree. The findings shows the  customers are satisfied with the system as in producing proper receipt and generating  correct amount of total. Besides they also strongly agree on the performance of the  system as in reducing the time of processing the sale at the counter.

**CHAPTER 5**

**CONCLUSION**

In summary, the project works is relevancy to the objectives set. The project is  designed based on preliminary study that had been carried on with Anjali Store. Thus  activities of developing the system which is planning and analysis is based on the result retrieved from the interview on observation. Not only that, as this would be the first  computerized system that will be used by the store, the functions only focused on solving  major problem which is inventory management problem. The interfaces design is also  categorized as user friendly due to lack of IT background of the workers which means the  system can be handle by people not even from IT background.

Due to time constraints, it is not possible for the developer to implement many  functions in the system, thus the developer have few future works suggestion for  continuation. Firstly, the development of integration between the system with the supplier  system ofAnjali Store. By integrating the both systems, Anjali Store system can  directly send the request of inventory order to the supplier when the stock level is low.  Thus, Anjali Store does need to order manually from the supplier which can cause  delay in the delivery of the products. By having this integration, Anjali Store can  practices Just-In-Time inventory where the store does not need to hold many stocks  which is not a good practice of inventory control.

Secondly, the implementation of decision support functions in the system. For  examples, data mining techniques or approach can be used to study the pattern of sales made. From the pattern analysis,Anjali Store can be used it to do marketing strategies  to its customer or even stock arrangement management can be done from the result. All  this action is believed to boost the sales of the store greater than the current.

Finally,anjali Store have to shift its ways of operating business in order to  stay competitive in the industry and against supermarket which is growing in Sarojni nagar area such as Tesco and Billion

**REFERENCES**

1. Iztok Fajfar(2015) ,start programming usingHTML,CSS,JAVASCRIPT

2. Tim Crosby(2007) , How Inventory Management Systems

3.Introducing JavaScript ,start programming using HTML,CSS,JAVASCRIPT

  4. HTML Mini Reference control , Building a sound Structure ,Minimal HTML Document from IZTOK FAJFAR(2015)