



Sir Syed CASE  
Institute of Technology

9th April, 2024

# Requirement & Specification Document

Submitted to: Dr. Shafaat A. Bazaz

Team: CASE Dev

**Project Title: Karyana Mart Sales and Inventory Management System**

Members	Roll numbers
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2. Rizwan ul Hassan (CYS)	2330-0135
3. Muhammad Talha Ramzan (AI)	2330-0141
4. Usman Aslam (AI)	2330-0150
5. Adil Khan (AI)	2330-0030
6. Taha Malik (CYS)	2330-0156

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## Preface

This Software Requirement Analysis and Specification with System Specification document has been prepared by the students of CASE Islamabad as part of the undergraduate Software Engineering course. The document is intended to provide a comprehensive analysis and specification for an Inventory and Sales Point of Sale (POS) system for Karyana Store, a fictional retail store.

The development of this document involved a thorough understanding of the requirements and needs of Karyana Store, as well as the application of software engineering principles and methodologies learned during the course. The document includes detailed descriptions of the functional and non-functional requirements of the POS system, along with use cases, system architecture, and user interface design.

The purpose of this document is to serve as a guideline for the development team at Karyana Store and provide a clear roadmap for the implementation of the POS system. It is our hope that this document will contribute to the successful development and deployment of the system, meeting the needs and expectations of Karyana Store.

We would like to express our gratitude to our instructors and mentors for their guidance and support throughout the development of this document. We also extend our thanks to Karyana Store for providing us with the opportunity to work on this project and gain valuable real-world experience in software engineering.

Students of CASE Islamabad

[Students]

1. Jawad Hassan
2. Rizwan ul Hassan
3. Muhammad Talha Ramzan
4. Usman Aslam
5. Adil Khan
6. Taha Malik

[Software Engineering]

[9 April, 2024]

## Introduction

Karyana Store, a prominent retail establishment, is in need of a modern Inventory and Sales Point of Sale (POS) system to streamline its operations and enhance customer service. The current manual system is inefficient and prone to errors, leading to inventory discrepancies and customer dissatisfaction. To address these challenges, the students of CASE Islamabad have undertaken the task of developing a comprehensive software solution that meets the specific needs of Karyana Store.

This document serves as a detailed analysis and specification for the proposed POS system. It outlines the functional and non-functional requirements, use cases, system architecture, and user interface design. The goal is to provide a clear understanding of the system's scope and capabilities, ensuring that it aligns with the expectations and requirements of Karyana Store.

The development of this document follows the principles and methodologies of software engineering taught in our undergraduate course. It represents our commitment to applying theoretical knowledge to practical, real-world scenarios, and showcases our ability to deliver high-quality software solutions.

We believe that the proposed POS system will significantly improve the efficiency of Karyana Store's operations, leading to better inventory management, accurate sales tracking, and ultimately, improved customer satisfaction. We are excited about the opportunity to work on this project and look forward to seeing the positive impact it will have on Karyana Store's business

## Glossary

**POS (Point of Sale):** The point at which a retail transaction is completed. It is the point at which a customer makes a payment to the merchant in exchange for goods or services.

**FMCG (Fast-Moving Consumer Goods):** Products that are sold quickly and at a relatively low cost. Examples include food and beverages, toiletries, and other consumables.

**GT (General Trade):** The traditional distribution channel in which goods are sold from manufacturers to wholesalers to retailers, as opposed to modern trade channels such as supermarkets and hypermarkets.

**Inventory Management:** The process of efficiently overseeing the constant flow of goods into and out of an existing inventory.

**Sales Tracking:** The process of monitoring and analyzing sales performance to identify trends, forecast future sales, and make informed business decisions.

**Barcode Scanning:** The use of a barcode reader to scan and read barcodes on products, enabling quick and accurate tracking of inventory and sales.

**Payment Gateway:** A service that processes credit card payments for online and traditional brick-and-mortar stores, securely transmitting payment information between the customer and the merchant.

**Retail Store:** A place of business that sells goods directly to consumers, typically in small quantities for personal or household use.

**UML (Unified Modeling Language):** A standardized modeling language used to visualize, specify, construct, and document the artifacts of a software-intensive system. UML offers a standard way to visualize a system's architectural blueprints, including elements such as activities, actors, business processes, database schemas, components, and interfaces.

# Semester Project

## Project Report and Specification Document:

### Report:

#### Q. What is the Project?

#### Semester Project



- ❖ Lets find out some problem that can be solved through software to provide profitable solution to **businesses** ☺
- ❖ **From where to get the business**
- ❖ Look around you with your family, friends etc.
  - Involve BBA, Accounting and Finance, B.Com Students
  - Small clinics (doctor, pharmacy, lab etc)
  - Small KARIANA stores, electrical/Hardware shops (Inventory/Financial management, etc). You can go to MARTS also to see how their inventory system work
  - Look into your family businesses etc etc

#### Steps (Each step is considered as one Assignment)

- ❖ Step 1: For each projects, make a team of 5-7 students. Submit the title of your project, Names of the team members by March 13, 2024 to your CR
  - Dr Shafaat will review the titles and confirm by March 20
- ❖ Step 2: Develop the Specification document as per the knowledge gained in the course. Submit your documents on Canvas by April 3

#### Step 2 -Submission deadline:

9<sup>th</sup> April, 2024

#### Our Team Members:

Total Members: 6 (not more than 7, perfectly makes a scrum team)

Members	Roll numbers
7. Jawad Hassan (AI)	2230-0035
8. Rizwan ul Hassan (CYS)	2330-0135
9. Muhammad Talha Ramzan (AI)	2330-0141
10. Usman Aslam (AI)	2330-0150
11. Adil Khan (AI)	2330-0030
12. Taha Malik (CYS)	2330-0156

Our Company Name: CASE Dev.

#### What and why is our Project?

Project goal: In family, friends or known person should be client (keyword)

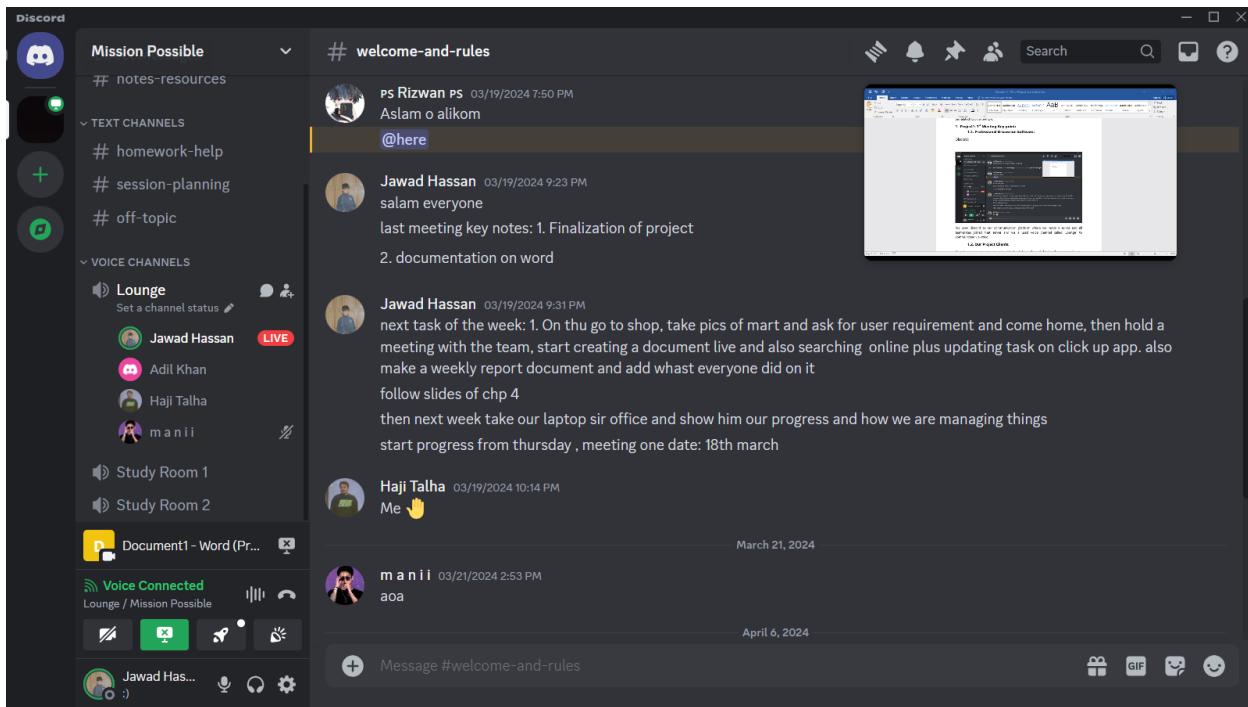
Project Title: **Karyana Mart Sales and Inventory Management System**

Project need: The reason we chose this project, as mentioned by Sir, the **CLIENT** has to be related to us somehow.

## **Project's 1<sup>st</sup> Meeting Key point (19<sup>th</sup> March, 2024):**

### **1.1. Professional Discussion Software:**

Discord:



We used discord as our communication platform where we made a server and all teammates joined that server and we used a voice channel called 'Lounge' to communicate via voice.

### **1.2. Our Project Potential Clients:**

After team discussion we figured out that in total we have 3 clients with commonality in Kariana Stores which makes up a perfect project as Sir mentioned that it could be a Kariana store.

<b>Member Name</b>	<b>Association with Client</b>	<b>Store Name</b>
Jawad Hassan	Friend's Store	Hameed Kariana
Rizwan ul Hassan	Father's Store	Adnan General Store
Muhammad Talha Ramzan	Cousin's Store	Hunain Karyana Store

## **Project's 2<sup>nd</sup> Meeting Key point (6<sup>th</sup> April, 2024):**

Roles assigned:

- Jawad Hassan – Software Interface Prototype/ UI design, Ethnography (Social Science) , Business Developer and Formal Interviewer(Questionnaires)
- Rizwan ul Hassan and Usman Aslam- User Story and Scenario
- Muhammad Talha Ramzan – Raw Data Elicitation, Analysis and Natural Language Specification
- Adil Khan – User Case UML design diagram and Flowcharts
- Taha Malik - Tasks cards from user stories

Task deadline: Must be done by 8<sup>th</sup> of April

## Specification Process:

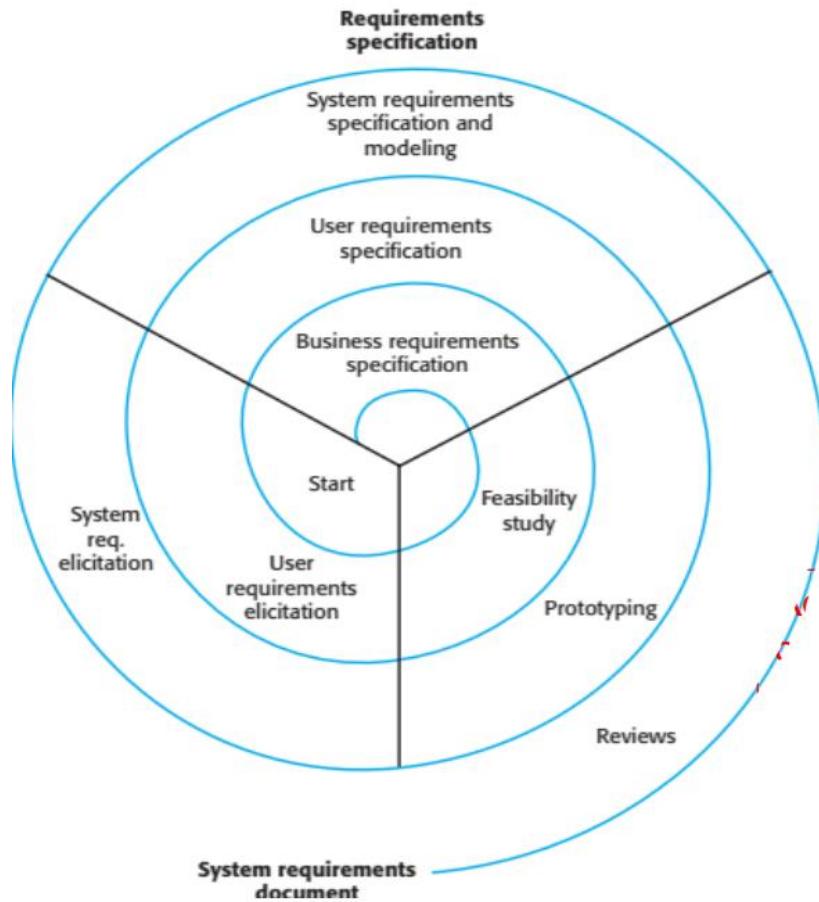
### Requirement Engineering Techniques:

From now own all the further documentation will be done by following our software engineering chapter 4 Requirement Engineering slides.

Slides Fact checking: Adil Khan

### Spiral Model Followed:

We tried our best to follow the basic steps of spiral model for Requirement Specification:



### What does our clients demand from software?

A simple easy to use software for karvana store which should be able to store product's data (Inventory), maintain and manage Sales and Customer Information and increase profit sales by generating reports.

#### 1. Requirements :

##### 1.1 Abstract User Requirements for Bidding Phase in order to win Contract:

- An easy way for users to easily use the software.
- The software should be able to easily store data.
- There should be a login system with a password for client (shop owner) privacy.
- Personal shop profit data should be secure and only accessible by the owner.
- It must track the stock from wholesalers and have their contact info.
- It must report sales at end of month and highlight products in profit.

## 1.2 Prototype in form of Potential software Interface layout (UI/UX design)

Made on Canva by Jawad Hassan

The screenshot shows the Canva editor interface with a project titled "Hameed Kariana Software". The left sidebar contains a search bar, project dropdown, and sections for Templates, Elements, Text, Brand, Uploads, Draw, Projects, and Apps. The main canvas displays a wireframe of a software application. At the top right of the wireframe is a yellow button labeled "main inventory" with a downward arrow. On the right side of the wireframe is another yellow button labeled "download" with a downward arrow. The central area of the wireframe is divided into sections: "INVENTORIES", "ORDERS", "ANALYTICS", "REPORTS", "MAIN INVENTORY", and a "PRODUCTS" table. The "MAIN INVENTORY" section shows a total stock value of "Rs.424 000,00pkr" and lists items like Milk, 1l, Milk Light, 1l, and Butter, 250 g. A green button at the bottom right of the wireframe says "+ Add Item". The bottom of the screen shows standard Canva navigation and settings.

This is the final user interface prototype for the "Hameed Kariana Software". It features a red header with the company name "Hameed Kariana Software" and a yellow "main inventory" button with a downward arrow. The main content area is divided into two columns. The left column contains a vertical menu with four items: "INVENTORIES" (selected), "ORDERS", "ANALYTICS", and "REPORTS". The right column is titled "MAIN INVENTORY" and includes sections for "PRODUCTS", "TOTAL STOCK VALUE" (Rs.424 000,00pkr), and "YOUR ACCESS TYPE" (Editor). Below these are three product rows: Milk, 1l, Milk Light, 1l, and Butter, 250 g, each with details like expiration date, quantity, and price. To the right of the table are edit icons (pencil, delete, etc.). A green "+ Add Item" button is located at the bottom right of the main content area.

# **Agreement/ Contract for Kariana Mart Sales and Inventory Management System**

## **Between:**

[CASE dev.](Hereinafter referred to as the "Developer"), with business address at [CASE B17, Islamabad]

## **And:**

Hameed Kariana Store (hereinafter referred to as the "Client"), with a business address at [Basti, Wah Cantt]

## **Project Description:**

The Developer agrees to develop a software solution for Hameed Kariana Store, referred to as the "Software," according to the specifications outlined in this agreement.

## **Scope of Work:**

- The Software will provide an easy-to-use interface for users.
- The Software will have the capability to store data efficiently.
- The Software will include a login system with password protection for client privacy.
- Personal shop profit data will be secure and accessible only by the owner.
- The Software will track stock from wholesalers and store their contact information.
- The Software will generate monthly sales reports and highlight profitable products.

## **Payment Terms:**

The Client agrees to pay the Developer a total of **10,000 PKR** for the development of the Software. This cost does not include maintenance. Maintenance costs will be subject to a separate agreement.

## **Confidentiality:**

Both parties agree to keep confidential any information received from the other party that is marked as confidential or that should be reasonably understood to be confidential.

## **Intellectual Property:**

The Developer retains all intellectual property rights to the Software developed under this agreement until full payment is received from the Client.

## **Term and Termination:**

This agreement will begin on the date of signing and will continue until the Software is delivered and accepted by the Client. Either party may terminate this agreement in writing if the other party breaches any material provision of this agreement.

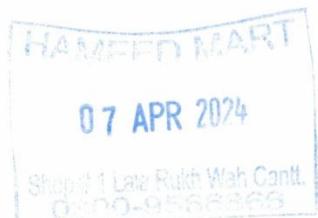
## **Governing Law:**

This agreement will be governed by and construed in accordance with the laws of [Your Country/State].

## **Signatures:**

Client:  Date: 7/4/24  
Developer:  Date: 7/4/24

Note: This agreement is subject to change or amendment with mutual agreement by both parties. Any changes will be made in writing and signed by both parties.



## Detailed Requirements after Winning the Contract by following Requirement Engineering Process

### 1. Elicitation and Analysis

#### 1.1 Requirements discovery and understanding

##### 1.1.1 Elicitation Techniques

**Focused Ethnography (observation):**

**Huge Scale Example Marts (Model Softwares) for Review and Understanding:**

-by Jawad Hassan

##### 1. CSD Mart:



##### Confidentiality:

Due to it being under armed forces organization we respected their policy of not taking picture of their sensitive data however we were allowed to note down the gathered data

##### Raw Data:

Item code	Description	Rate	Unit	On hand
101259		10/-	kg	11kg
				Mobile Inverter

<p><u>Big Mart</u>: <u>found</u> <u>General</u>  <u>65/30</u></p> <p><b>CSD</b></p> <p>How it works: (Questions) Restricted Access (Army)</p> <p>1) How Karyana vs CSD?</p> <p>Ans. Operations (why customer prefer) CSD</p> <p>Karyana - Traditional</p> <ul style="list-style-type: none"> <li>Software - Account ledger/balance sheet           <ul style="list-style-type: none"> <li>soft sheet</li> <li>Upgraded balance sheet is software</li> </ul> </li> <li>Software to control shop:           <ul style="list-style-type: none"> <li>Activities in shop</li> <li>Retail shop (sector) 3 major</li> </ul> </li> </ul> <p style="text-align: right;">Dashboard realtime</p> <p>1) Purchase</p> <p>2) Sale</p> <p>3) Return Procedure (Refund)</p> <p>4) Online</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">A</th> <th style="text-align: center; padding: 5px;">B</th> <th style="text-align: center; padding: 5px;">Account Summary</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">Debit</td> <td style="text-align: center; padding: 5px;">Credit</td> <td style="text-align: center; padding: 5px;">A-B</td> </tr> <tr> <td style="text-align: center; padding: 5px;">At Purchase</td> <td style="text-align: center; padding: 5px;">Sale</td> <td style="text-align: center; padding: 5px;">↓ Account Report</td> </tr> <tr> <td style="text-align: center; padding: 5px;">Return</td> <td></td> <td></td> </tr> </tbody> </table> <p>government.</p> <ul style="list-style-type: none"> <li>Only approved product.</li> <li>Profit: - w/o. (Karyana)</li> <li>S.Y. net profit salary</li> </ul> <p>Mart → More item - Volume</p> <p>less percentage</p> <p>Customer portfolio</p> <ul style="list-style-type: none"> <li>Pattern for shelving follow.</li> <li>food / non food</li> <li>Separate:</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">food</th> <th style="text-align: center; padding: 5px;">non food</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center; padding: 5px;">business strategy: segmentation of market</td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 5px;">depends on location</td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 5px;">CSD - 80% cheap (Liquor!)</td> </tr> </tbody> </table> <p>entrance</p> <ul style="list-style-type: none"> <li>eye catching products</li> <li>Kids products (sticker)</li> <li>Impulse zone (counter)</li> <li>near eye vision (snacks)</li> </ul> <p>Software</p> <ul style="list-style-type: none"> <li>① code on items (ready for sale)</li> <li>② Pick products - excel - Item code, Name, size, Tissue, 400ml, smooth, shampoo</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">cost Price</th> <th style="text-align: center; padding: 5px;">Sale Price</th> <th style="text-align: center; padding: 5px;">Manufacture</th> <th style="text-align: center; padding: 5px;">Supplier</th> <th style="text-align: center; padding: 5px;">Margin report</th> </tr> </thead> </table>	A	B	Account Summary	Debit	Credit	A-B	At Purchase	Sale	↓ Account Report	Return			food	non food	business strategy: segmentation of market		depends on location		CSD - 80% cheap (Liquor!)		cost Price	Sale Price	Manufacture	Supplier	Margin report	<p>Inventory Management System:</p> <ul style="list-style-type: none"> <li>Stocks <math>\rightarrow</math> Enter system</li> <li>Item details</li> <li>Item code (specialized code) - local</li> <li>barcode <math>\rightarrow</math> Registered International items (barcode) same eg shampoos (international)</li> </ul> <p>Make their own code: 00 55.00 !</p> <p>Scan <math>\rightarrow</math> Flavour, Price, date of induction, list, mL (Size) each different code:</p> <ul style="list-style-type: none"> <li>code for 1 product (specific)</li> <li>counter (level of access) <math>\rightarrow</math> sales list</li> </ul> <p>① Purchases: <u>POS</u> (Counter)</p> <ul style="list-style-type: none"> <li>Bulk store (Main store)</li> <li>Stock assign - bar code stamp</li> <li>Than shelf.</li> <li>Feeder store 1 floor</li> </ul> <p><u>Mart</u></p> <p>administration <math>\rightarrow</math> Invoice entry in computer</p> <p>security:</p> <ol style="list-style-type: none"> <li>1) Cyber security</li> <li>2) cashflow security</li> </ol> <p>How to help Karyana:-</p> <ol style="list-style-type: none"> <li>1) Churn salt - blacklist.</li> </ol> <p>Karyan can sell items that CSD can't due to</p> <p>balance / bill.</p> <p>Retail Sector Account</p> <p>② Purchased from? Record from Whole Seller</p> <p>bill <math>\rightarrow</math> provision stock receipt voucher <math>\downarrow</math> bill entry receiving.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">Bill</th> <th style="text-align: center; padding: 5px;">date</th> <th style="text-align: center; padding: 5px;">Supplier name</th> <th style="text-align: center; padding: 5px;">Item</th> </tr> </thead> </table> <p>Financial Manager Finance department <math>\rightarrow</math> Report (Pay Uniliver)</p> <p>③ Stock <math>\rightarrow</math> Bill <math>\rightarrow</math> payment. (No cash)</p> <p>Instrument of purchasing / instrument of purchasing <math>\downarrow</math> Not manual computer</p> <p>Tide reverse mechanism</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">A</th> <th style="text-align: center; padding: 5px;">B</th> <th style="text-align: center; padding: 5px;"><math>=</math></th> <th style="text-align: center; padding: 5px;">Recheck</th> <th style="text-align: center; padding: 5px;">Account Summary</th> </tr> </thead> </table> <p>Payment Not cash counter not correct</p> <p>Check n balance</p> <p>audit - within 3 months</p> <p>✓ Karyana <math>\rightarrow</math> monthly</p> <p>daily <math>\rightarrow</math> POS - A cash</p> <p>Store <math>\rightarrow</math> Monthly.</p> <p>Stock Inhands (Inventory held).</p>	Bill	date	Supplier name	Item	A	B	$=$	Recheck	Account Summary
A	B	Account Summary																																	
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1) Purchase - Inventory (Display)	
2) Sales (barcodes - price tags)	
Kargana → Chart.	
<u>old stock</u> policy → old → less expensive.	
rule → more expensive	
Stocked 10-15 days hurdles → app - tells before finish.	
6 months → 1 stock.	
button → Point of sales operator	Roles
Modules (limited source)	Purchase order
restriction:-	
- Total sales	
- Return enter	
- Item details.	
can see	store, floor
- Sales	staff, POS, Manager
- discount	user id
- payment mode	
(1) Scan	
(2) Cart	Barcode scanner
(3) Payment mode	Credit Cash
(4) Bill number	
(5) Search option -ata	Inventory less 1
cat num → A	B
	Stock Inhand
Not customer name, → serial number → item code	

out of stock	average monthly sales
Quantity bin	AM S
↓	→ AIDS X
days, percentage	
Replenishment Schedule.	
15 days	blink
Not auto & manual	
Seasonal effects.	
General item - not updown	
basic necessities → Eid, Ramzan, sales	
Demand generation.	
Enquiry - Daily Supplier (+ visit)	
bread, egg.	
Off invoice - addition, system	
Space → 4% discount	
on account of shelf rent	

Period			Account summary		
<u>Inventory</u>			Sales		
Food Group					
House hold group					
Personal Care Group					
<u>Grand Total</u>					
LP			PAS		

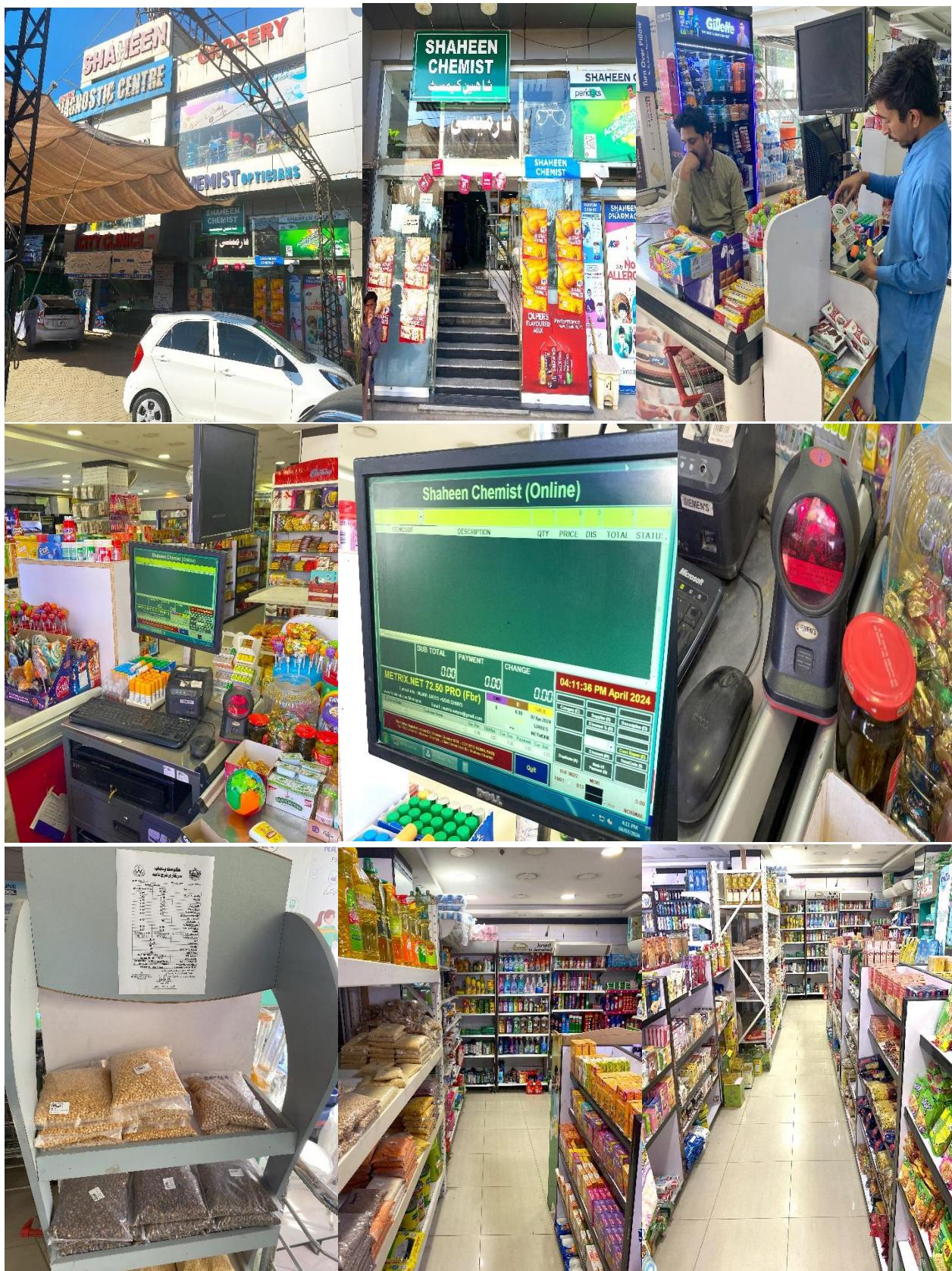
Centralised data base.

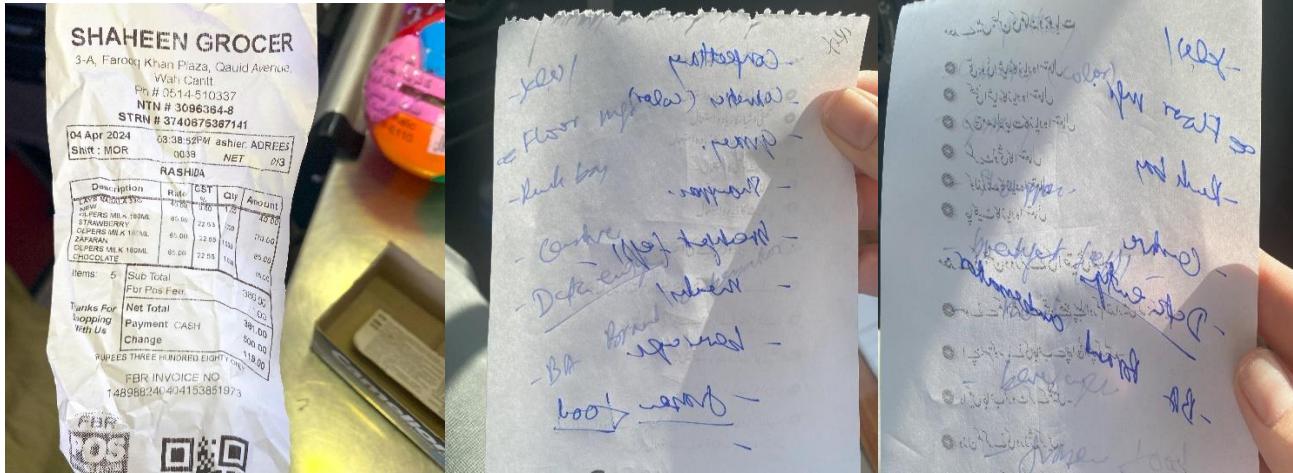
Kargana

Search	Total
	SubTotal
	Discount
	Payable
	Payment
	Charge

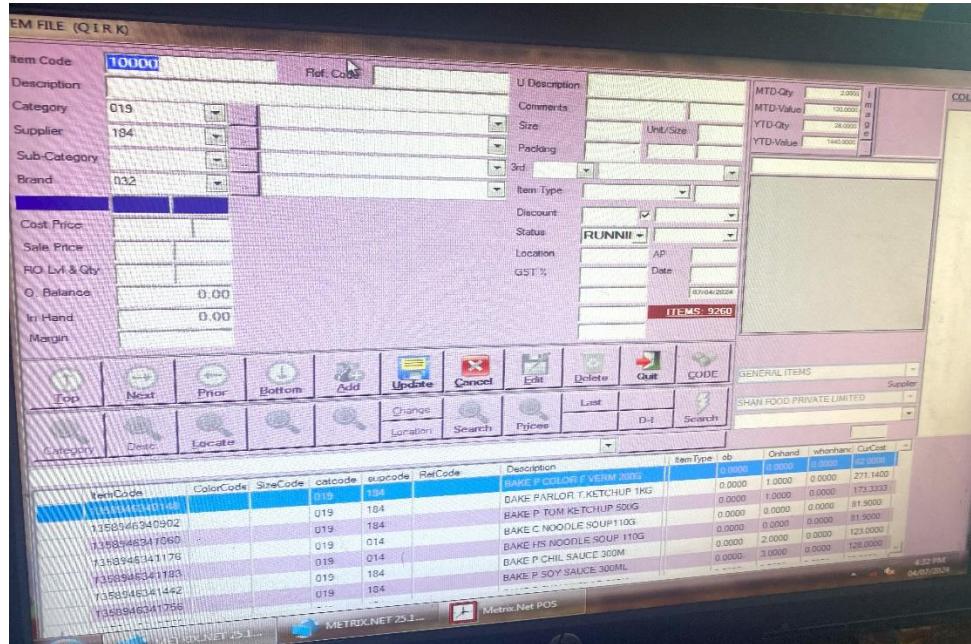
## 2. Shaheen Cosmetics:

We were allowed to take pictures of their system, software and aisles:





## **Example Software (Inventory):**



### 1.1.2 Analysis:

**Some Key points learnt from these big marts to increase profit:**

- a. Software should control marts by creating Account ledger/ Balance sheet
  - b. Catering for Seasonal effects and Off-invoice shelf rent implementation
  - c. 3 activities in marts(Retail Store):
    - i. Purchase (whole sellers)
    - ii. Sale (customers)
    - iii. Return (Refund)
  - d. Account summary (debit = credit )
    - i. At end of month
    - ii. At end of day
  - e. Inventory management system, every item has its own shop or international barcode
  - f. Karyana can add blacklist items that big marts cannot eg. China Salt
  - g. Have eye catching impulse zone near cashier, discounts on most demanded/ old stock

## Main Targeted client Mart:

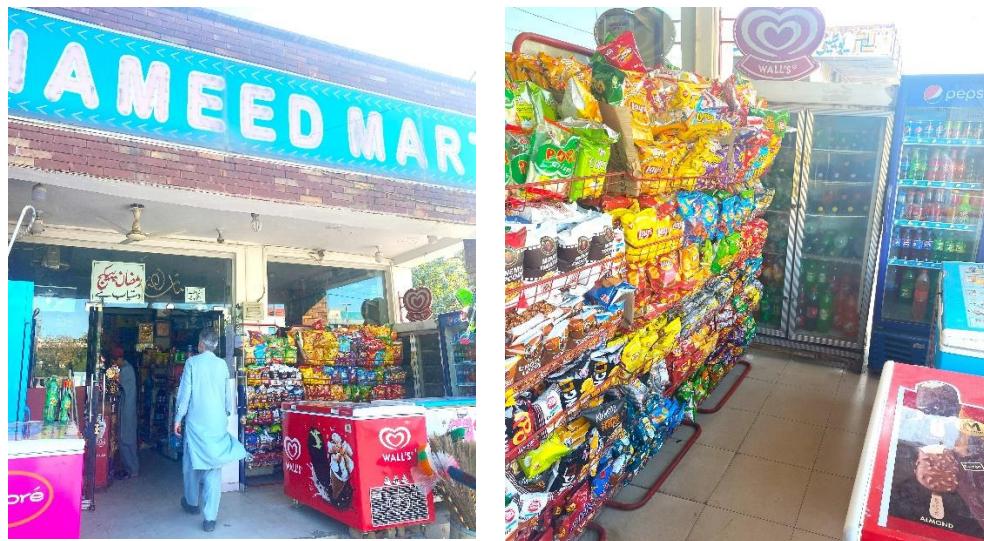
- Hameed Kariana Mart

## Satellite Map location:



Fig.1

## Entrance View:



## Positive Selling Points:

1. Location is corner and near traffic signal stop
2. Eye catching products at entrance for kids
3. Discount rack at the entrance
4. Variety and quality of items with reasonable price
5. This is a General trade store consisting of Fast-moving consumer goods

## Inside View:



## Mart own product series (Branching out):

Different types of dates:



## Types of Aisles:

These are different types of aisles present in the karyana sequentially:



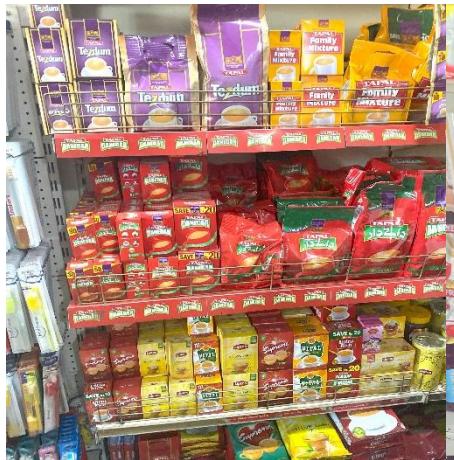
#1 Frozen items & Cold Beverages



#2 Breakfast items



#4 Dairy Products



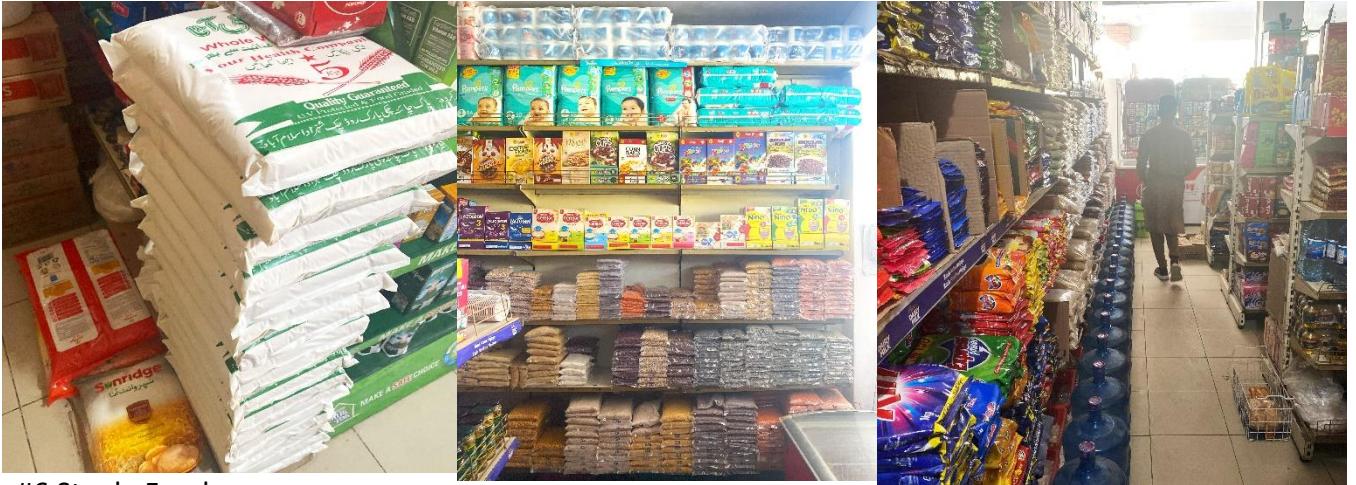
#5 Canned/ Confectionery



#2 Breakfast items



#5 Canned/ Confectionery



#6 Staple Food

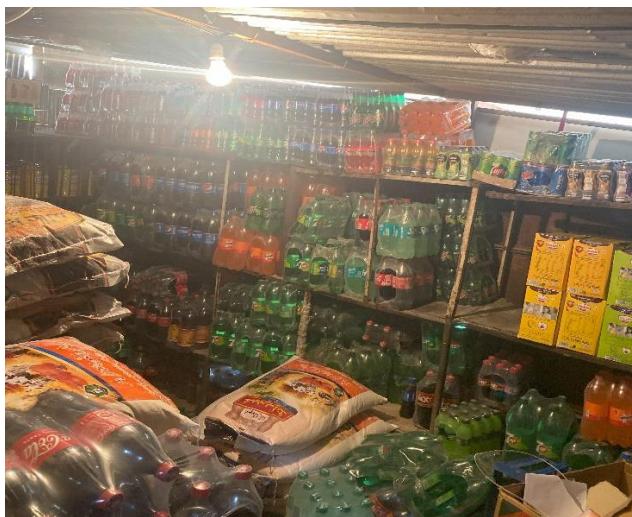
### **Shelving Pattern followed according to Customer Footfall:**

One thing I really liked is that the kariyana knew hot drink item like tea is sold more than coffee/ green tea so it is placed on the customer eye level as shown in figure below:



### **Back (Inventory store) store:**

It contains all the fast moving extra items received from the whole seller



## Problem and Issues/ (Reason for software):

The clients (shop owner of Hameed mart and other stores) are all worried due to the fact that most of their customers are being driven away from small karyana marts and are preferring big marts like D.watson as shown in above Fig 1. Aerial view white circle.

### Current trend:

Usually these days our clients are filling in data on registers and using old school methods which causes delay in sales and makes the customer fed up due to inconvenience. So customer prefers big marts.

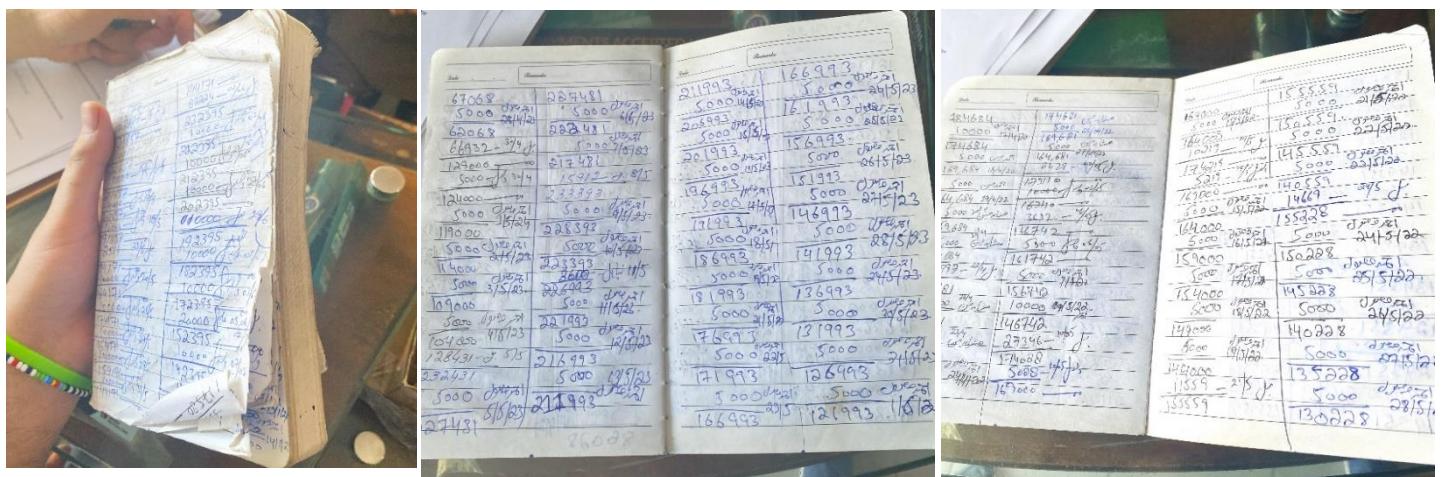
### Issues:

#### 1. Manual Record Keeping (Register Based)

It creates confusion, loss of previous data, difficulty in searching, tracking and predicting future purchase requirements. Our software will replace following two registers:

- Purchases from Whole seller
- Daily sales Record

As shown in following figure:



#### 2. No Standardized Item Codes

Not using one system of standardized code creates confusion in tracking inventory but karyana uses 4 codes:



1. Barcode



2. Shop 3 digit code



3. Prices instead



4. Unlabeled

### 3. Uncategorized item placement on aisle:

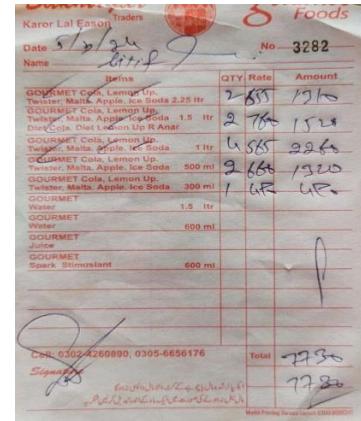
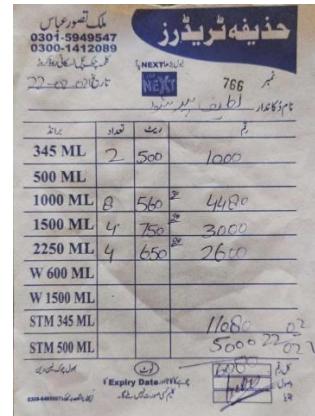
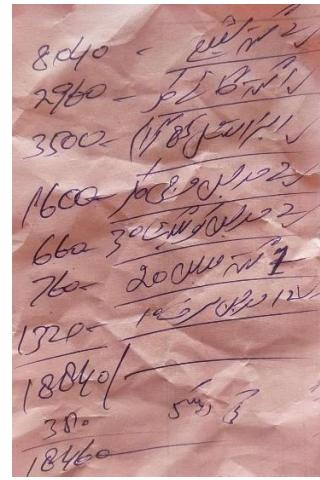
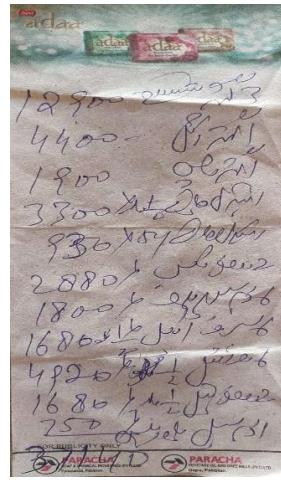
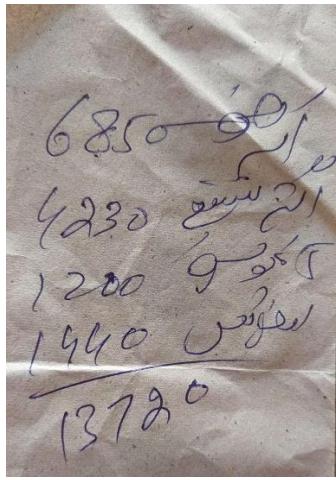
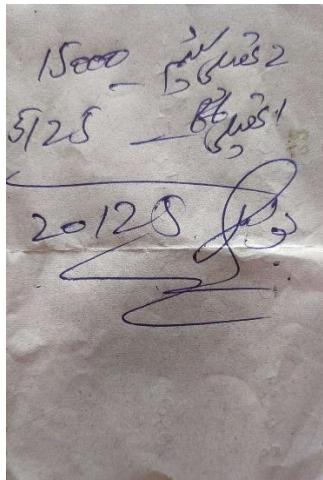
Due to non-standard placement of some items, Customers cannot trace the item, it causes waiting ques and delays in payments at cash counter and errors in billing.



➤ **Hunain Karyana Store:** -by Muhammad Talha Ramzan

#### Store's Raw Data (Receipts):

These are some manual receipts and bills elicitation:



## Solution (why):

We went to observe different big marts such as CSD and Shaheen Mart, collected their data, viewed their inventory software and figured out the reason why customers are driven towards these marts instead. We will use these software engineering tools and techniques to create a system for our clients that will solve this arising problem and help them manage their product sales, inventory and thus gain more profit.

## Effective Formal Interviewing Questionnaires (Closed) - By Jawad Hassan

Owner:

1. Why you want to shift to automated inventory and sales management instead of current manual register entry based system?
  - Mistakes in total
  - Forgetting bill
2. What kind of automated system functionalities you would like to have?
  - credit
  - cash
  - inventory
3. What are your long-term business goals for the store, and how does automation fit into those plans?
  - sales analysis
  - Monthly sale
4. How would you measure the success of implementing an automated inventory and point of sale system?
  - Profit margin should increase
5. Can you identify any potential risks or challenges associated with transitioning from a manual to automated system?
  - Transition half register/ half software
6. How do you envision the store's competitive advantage being enhanced through automation?
  - Customers will prefer this store as it is near than D-Watson
7. What strategies do you have in place to monitor and assess the store's performance relative to competitors?
  - Small store (more discount)

### Cashier with Register:

1. What are the most time-consuming aspects of your job when processing sales transactions?

• Writing in register is time consuming . delay .  
- customer que.

2. How do you currently handle situations where items are not scanning correctly or pricing discrepancies arise?

Manual code system.

3. In cases where items lack barcodes, such as rice bags, how do you currently identify and input these items into the system?

• A lot new codes and mention on register

4. Would you find it beneficial to have a system in place that utilizes QR stickers or custom codes for items without barcodes?

• Custom codes will be preferred.

5. How do you envision this solution impacting the efficiency and accuracy of recording sales transactions for items without barcodes?

• Currently mistakes in register

6. How do you handle customer feedback or complaints related to competitive pricing, product availability, or service quality?

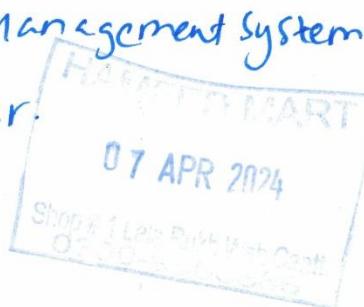
• Return the items .

**Store Keeper:**

1. What challenges do you face in maintaining organized shelves and ensuring accurate inventory counts?
  - Self manager categories according to season - swap items in season
2. How do you currently track stock levels and determine when to reorder items?
  - Check items in back store.
3. Can you describe any issues with stock rotation and managing expiration dates for perishable items?
  - returned to whole saler.
4. How important is real-time visibility into inventory levels and product locations to your daily tasks?  
*Cameras installed*

**Customers:**

1. How do you perceive the shopping experience at the store?  
*It is very time consuming  
I have to wait a lot.*
2. Can you describe any frustrations or inconveniences you've encountered while shopping here?  
*Yes I just wanted to buy one milk pack  
due to writing on register.*
3. How important is the availability of a wide variety of products and accurate pricing information to you?  
*It is very important*
4. Are there any features or services offered by other stores that you would like to see implemented here?  
*Computer Inventory Management System  
and barcode scanner.*



Adnan is an owner of Kariyana Store in Islamabad (Near B-17). He thinks that as today's modern technology is advancing, he decided to upgrade his kariyana store with today's technology. As he sees people shifting their store to online and also adding software to their stores which gives them a lot of benefits. He also think that adding software to his store will give him and client a lot of advantages. So, Adnan also want software which help him manage his products and all the information.

As the owner of the Kariyana store, he require a sophisticated information management system to oversee various aspects of his business operations effectively.

The system should provide detailed insights into the inventory, including the types of products available, their names, barcodes, descriptions, prices, stock quantities, and expiration dates if applicable. This information is crucial for inventory tracking, restocking decisions, and ensuring product availability for customers.

He need access to comprehensive supplier details, including supplier names, contact information, and the frequency and quantity of supplies received from each supplier. This data will help him maintain strong supplier relationships, track deliveries, and manage inventory efficiently.

It is essential to have a database of customer information, including customer names, contact details, and records of their previous purchases. This information will enable personalized customer interactions, targeted marketing strategies, and the development of strong customer relationships.

As the owner of the Kariyana store, he requires a system that captures detailed sales data for every transaction, including information on the items purchased, quantities, prices, and dates of purchase. Additionally, he needs to track the payment methods used, such as cash or card, and whether any discounts or promotions were applied during the transactions. This data will help him analyze sales performance, understand customer preferences, and make informed decisions to optimize revenue.

In terms of reporting needs, he was looking for the capability to generate daily, weekly, and monthly sales reports to monitor business performance and identify trends over time. Furthermore, he need alerts for low stock levels to ensure timely restocking and prevent stock outs. These reports and alerts will enable him to make data-driven decisions, manage inventory effectively, and enhance customer satisfaction by ensuring product availability.

Regarding security and access control, he need to define user roles and access levels for individuals who will use the software. It is essential to specify which users can access certain features or data based on their roles within the organization. Additionally, he may require extra security measures for specific features or sensitive data to protect confidential information and prevent unauthorized access. Implementing robust security and access control measures will safeguard the integrity of the system and ensure data privacy for the Kariyana store.

After all the information he give, then he contacted with different company and started bidding on it. In the end he got his contract with Case Dev (Our Company). Adnan sent an email to CEO of CASE dev. (**Dr. Shafaat A. Bazaz**) to see if he can recommend system for his store.

## **Kariyana Store User Story Task Cards – by Taha Malik**

### **1. Inventory Management Tasks:**

- Enter data for each item into the inventory system.
- Maintain records of expiration dates and highlight expiring items.
- Set inventory level alerts when stock is low.

### **2. Supplier Management Tasks:**

- Create a database of supplier information.
- Maintain records of transactions with each supplier.
- Set up automatic notifications for new shipments.

### **3. Customer Management Tasks:**

- Create a customer database with contact details and previous purchase records.
- Implement a loyalty program to reward regular customers.

### **4. Sales and Transaction Tasks:**

- Maintain records of each transaction including item details, quantity, price, date, and payment method.
- Keep track of discounts and promotions and analyze their impact.

### **5. Reporting and Analysis Tasks:**

- Generate daily, weekly, and monthly sales reports.
- Analyze sales trends and identify best-selling items.

### **6. Security and Access Control Tasks:**

- Create user accounts and define their access levels (Admin, Staff, etc.).
- Implement data encryption and conduct regular security audits.

## 2. Standard Requirement Specifications

### 2.1 Natural Language Specification- by Muhammad Talha Ramzan

1) Inventory Information:-

→ Tuck item... → <sup>Baking item</sup> Cold drink

Biskut chips

Juice - coke

Cake eggs

etc

→ Ice cream

→ <sup>Sugar</sup> <sup>Cream</sup> Karyanw item

→ Stationers item

→ Saman gar k liza

Note book pen

jhadlo - pocha

etc.

TISSU paper

Khad Apny marzi say cheery add karley

ya categories hain or option ge hain

chixia k ek or daty gary banay -

2) Supplier Information:-

Different quantity me saman abhi how  
zakat k mutabiq ...

:- Roz din k last me sms show hona  
chixia k koi sa saman Raha gaya hai  
or ketha sale hua hai.

→ Supplies Contact Information:-

Cold drink → ~~Hurt Huzifa~~ → 0301-5949547

Ice cream → 0305-6656176-

Karyai item →

Stationers →

→ Fuck item →

→ gas ka shop →

### 3) Customer Information:

Reader ko store rakhy and din kay profit ko store kary or roz display kary item sale :-

Her customer ka record save kary

### 4) Sale data:-

Her transaction k details ko store kary and or daily profit ko b. calculate kary. Date k sath.

→ payment method:-

cash only.

### Discount:-

To record store kijn hai us ky mutabik jo customers her monthly sale

karty hain un ko 10% discount  
dena hain.

Or Eid ~~or~~ ~~or other~~ ~~exp~~  
~~honge waly per~~  $\beta$  discount hona  
chayra option ho discount k liye.

### 5 Reporting needs:

- Daily base report honi chahiye  
jo daily profit show karey or  
ya be batay k tu se item  
kaha sale hua ha or kaha  
km do gaya hai or km se  
item mognan waly hai or km  
a item km raha gaya hain or  
km say item ki sale zaya karta  
ha.
- Or weekly se b batay k km  
si item nahi sale ho raha or  
k se item. weekly base per  
zaya sale ho raha hain.
- Or sale holder ka number b  
display ho reports k sath te k  
liye ja sakhi.

Mony sale show ho or  
phir Mony profit to show  
ho or ya to padai chalega  
kis kis din zayada sale  
huvi or average sale kya  
na.

⇒ Sub helper ki salary automatic  
Transfer ho jay her month ki  
First date ko. or so last  
ma profit show hota ha.  
wo padai chala gay.

### → UDhar System:-

Per customer sale ma ya be show  
hona chya k katni sale nahi  
huvi ha or katni sale udhar  
huvi ha or esa system hona.  
chyia so customer udhar layn un  
ko sms show ho gay or month  
k last ma ~~the~~ un ko  
sms chaly gy un k total  
calculator ho kar.

⇒ Security and Access Control:-

Stake holder → owner → helper

data Entry →

⇒ Access level:-

Only owner can see profit and daily  
base monthly and weekly → sale

Other ke helper or data Entry only  
dekh sakte hain.

③ Expire items:

Jin cheez k expire date nazdaak  
ho Example 1 week phalg display  
ho gay or report ~~on exp~~ - na  
display ho gay. ho option ho  
k kamy din play display ho or  
ongar ~~not~~ add karna bhot gaya to  
automatic add ho gay.

## 2.2 Stakeholders Involved:

Stake holders in this project include:

1. CEO of CASE dev. (Dr. Shafaat A. Bazaz)
2. Development team (CASE Dev.)
3. Software engineers (CASE Dev.)
4. Shop Owner(Junaid s/o Hameed)
5. Cashier(Junaid)
6. Shop store keeper(Shahbaaz)
7. Shelf planner/ manager
8. Customers
9. Whole sale Suppliers

### Kariana Mart Sales and Inventory Management System/Business Software/SRS/2.3.1

**Function** Manage Record of Product: Inventory, Sales and Customer Information. Generate Reports and Alerts.

#### **Description**

The system will manage product details (types, names, barcodes, descriptions, prices, quantities, expiration dates), sales transactions (items purchased, quantities, prices, dates, payment methods), and customer information (names, contact details, purchase history). It will generate daily, weekly, and monthly sales reports and alerts for low stock levels.

**Input** Product information, sales transaction details, customer information.

**Output** Confirmation of changes, sales data, customer interaction logs, sales reports, stock level alerts.

**Source** User input, point of sale terminals, customer interactions and inventory monitoring.

**Destination** Database for data storage, reporting interface, alert system.

#### **Action**

The customer selects items from the shelves and moves to POS cash counter. Items are scanned by barcode scanner and bill is generated on thermal printer. Payment is done by customer via cash or credit card. Sales record is updated for cash received and inventory record is also updated for items sold.

#### **Pre-Condition**

The selected items must be available in the inventory. The system must be operational and accessible to customers.

#### **Post-Condition**

The customer's bill is paid, and the transaction is completed. Sales records are updated to reflect the transaction. The inventory record is updated to deduct the selected items.

## User and System Requirements

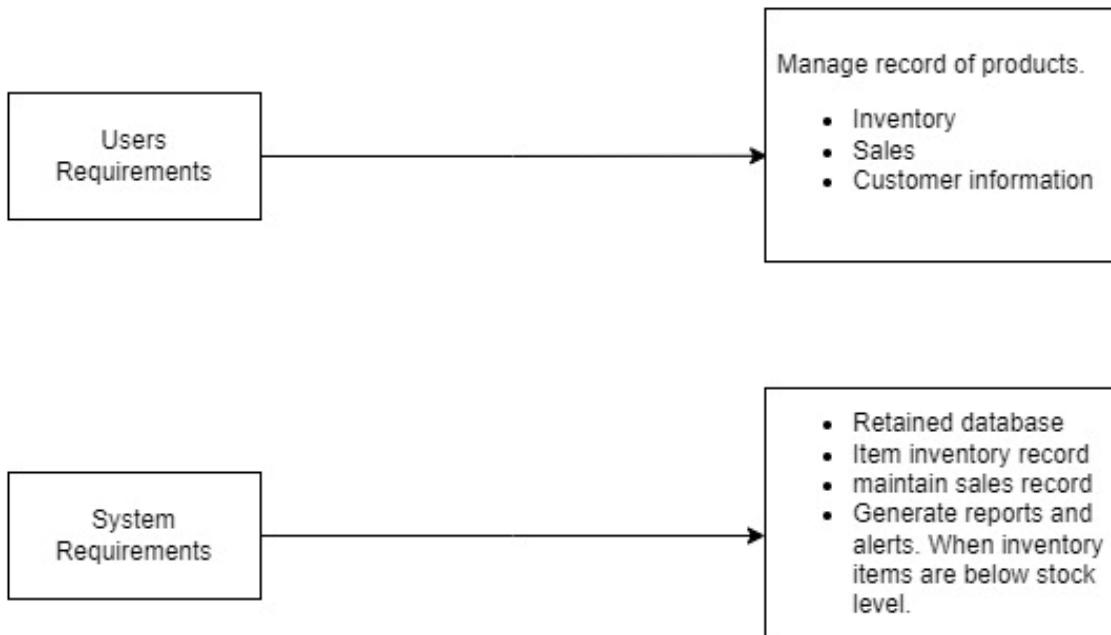
### User Requirement Definition

1. The system shall Manage Record of Product: Inventory, Sales and Customer Information. Generate Reports and Alerts.

### System Requirement Specification

- 1.1 The system must be able to maintain real time records of products in inventory, including details such as quantity, location, and status.
- 1.2 The system should track sales transactions, including date, time, products sold and customer information, to maintain an accurate record of sales.
- 1.3 The system should store and manage customer information, such as contact details, purchase history, and preferences, to facilitate personalized customer service.
- 1.4 The system should generate various reports, such as inventory status, sales performance, and customer analytics, to provide insights for decision-making.
- 1.5 The system should be able to generate alerts for low inventory levels, high sales volume, or other relevant events, to help in proactive management of the business.

Flowchart by Adil Khan



## **Functional Requirements**

### **Inventory Management:**

- The system shall provide functionality to manage:
  - Product types
  - Names
  - Barcodes
  - Descriptions
  - Prices
  - Stock quantities
  - Expiration dates (if applicable).
- Searching And Tracking
  - Inventory tracking
  - Restocking decisions
  - Ensuring product availability.

### **Supplier Management:**

- The system shall allow for the management of:
  - Supplier details including names, contact information, and details of supplies received.
  - Tracking deliveries, maintaining supplier relationships, and efficient inventory management.

### **Customer Management:**

- The system shall include features for:
  - Storing customer information such as names, contact details, and purchase history.
  - Personalized customer interactions, targeted marketing, and building strong customer relationships.

### **Sales Data Management:**

- The system shall capture and manage:
  - Detailed sales data for each transaction including items purchased, quantities, prices, dates, and payment methods.
  - Analysis of sales performance and understanding customer preferences.

### **Reporting and Alerts:**

- The system shall generate:
  - Daily, weekly, and monthly sales reports to monitor business performance and trends.
  - Alerts for low stock levels to facilitate timely restocking and prevent stock outs.

## **Non Functional Requirements**

### **Security and Access Control:**

- The system shall implement:
  - User authentication mechanisms with role-based access control.
  - Encryption for sensitive data transmission and storage.
  - Measures to prevent unauthorized access and ensure data privacy.

### **Performance:**

- The system shall ensure:
  - Fast response times for user interactions and data retrieval.
  - Scalability to handle increasing data and user loads over time.

### **Reliability:**

- The system shall be:
  - Highly available, with minimal downtime for maintenance or upgrades.
  - Capable of recovering from failures gracefully without data loss.

### **Usability:**

- The system shall provide:
  - Intuitive user interfaces for ease of use.
  - Clear navigation and informative feedback to users.

### **Compatibility:**

- The system shall be compatible with:
  - Various web browsers and operating systems commonly used by the target users.
  - Integration with existing hardware and software systems, if applicable.

### **Scalability:**

- The system shall be designed to:
  - Accommodate growth in data volume and user base without significant performance degradation.
  - Scale resources horizontally or vertically as needed to meet demand.

### **Maintainability:**

- The system shall be:
  - Well-documented with clear code structure and comments.
  - Modularized to facilitate updates, bug fixes, and enhancements.

## **Required Hardware Equipment**

To run this software we need following hardware equipment:

1. Computer (PC):
  - a. Processor: Intel Core i5 or equivalent
  - b. RAM: 8GB or higher
  - c. Storage: 256GB SSD or higher
  - d. Operating System: Windows 10 or higher
2. Barcode Scanner:
  - a. Type: USB-connected handheld or desktop scanner
  - b. Compatibility: Should be compatible with Windows
  - c. Resolution: Minimum 1D/2D barcode scanning capability
3. Thermal Printer:
  - a. Type: USB-connected thermal receipt printer
  - b. Compatibility: Should be compatible with Windows
  - c. Print Speed: 150 mm/s or higher
  - d. Paper Size: 80mm width for standard receipt printing
4. Monitor:
  - a. Size: 21 inches or larger
  - b. Resolution: Full HD (1920 x 1080) or higher
  - c. Keyboard and Mouse:
    - d. Standard USB or wireless keyboard and mouse
5. Barcode Labels and Receipt Paper:
  - a. Purchase barcode labels compatible with the barcode scanner
  - b. Purchase thermal paper rolls compatible with the thermal printer
6. Cash Drawer:
  - a. USB-connected cash drawer
7. Customer Display:
  - a. USB-connected customer display for showing transaction details

## **Test Cases**

### **1. Inventory Management:**

- Test Case 1: Verify that the software can add a new product to the inventory.
- Test Case 2: Verify that the software can update the quantity of a product in the inventory.
- Test Case 3: Verify that the software can delete a product from the inventory.
- Test Case 4: Verify that the software can generate a report of current inventory levels.

### **2. Sales Management:**

- Test Case 5: Verify that the software can add a new sale transaction.
- Test Case 6: Verify that the software can update the details of a sale transaction.
- Test Case 7: Verify that the software can delete a sale transaction.
- Test Case 8: Verify that the software can generate a report of daily sales.

## Mathematical specifications

Basic formulas for inventory, sales, and profit calculations:

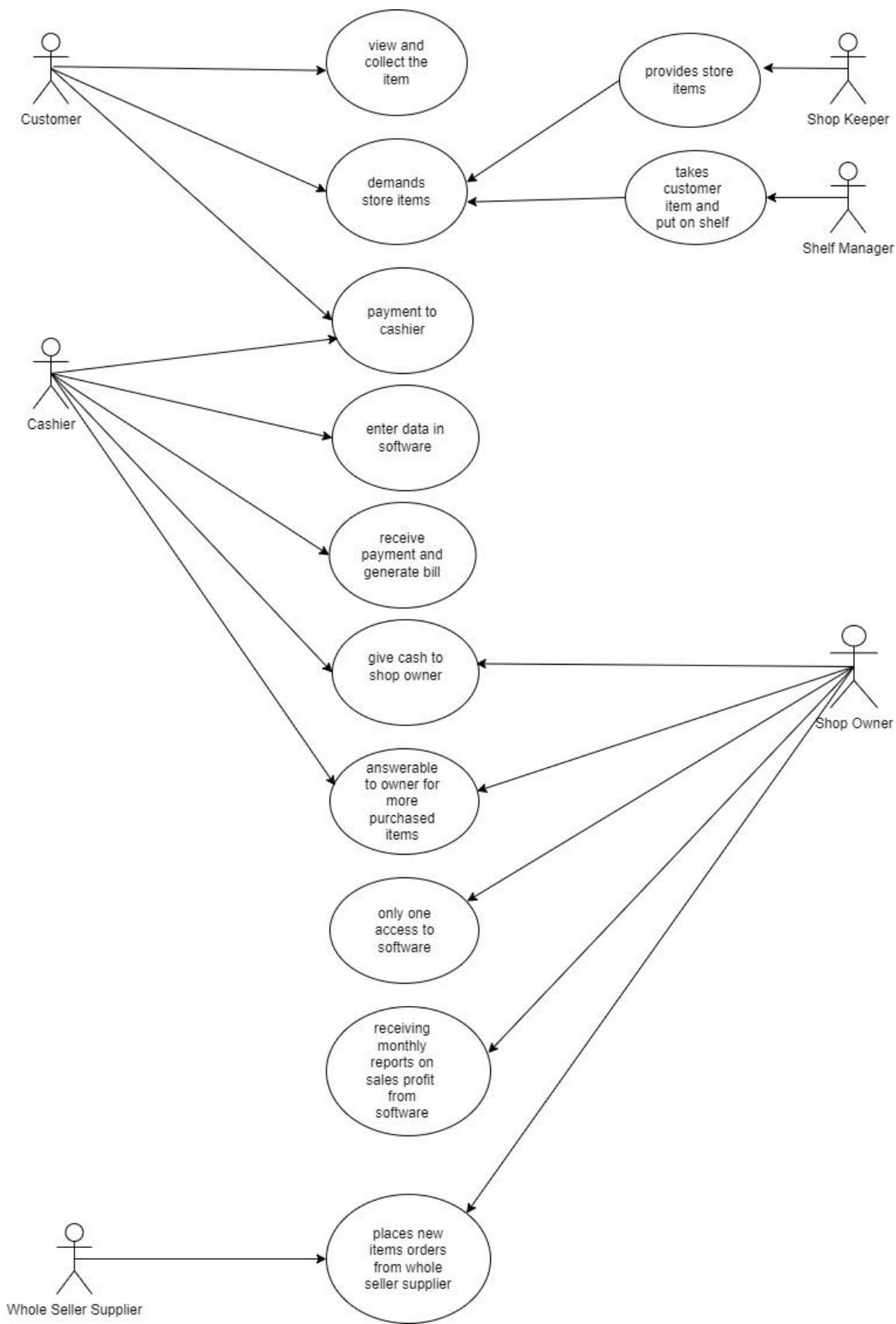
Category	Formula
Inventory	Ending Inventory = Beginning Inventory + Purchases - Sales
Sales	Sales = Quantity Sold * Price per Unit
Profit	Profit = (Sales - Cost of Goods Sold) - Expenses

## Non-Functional Requirement Specification in Tabular Form

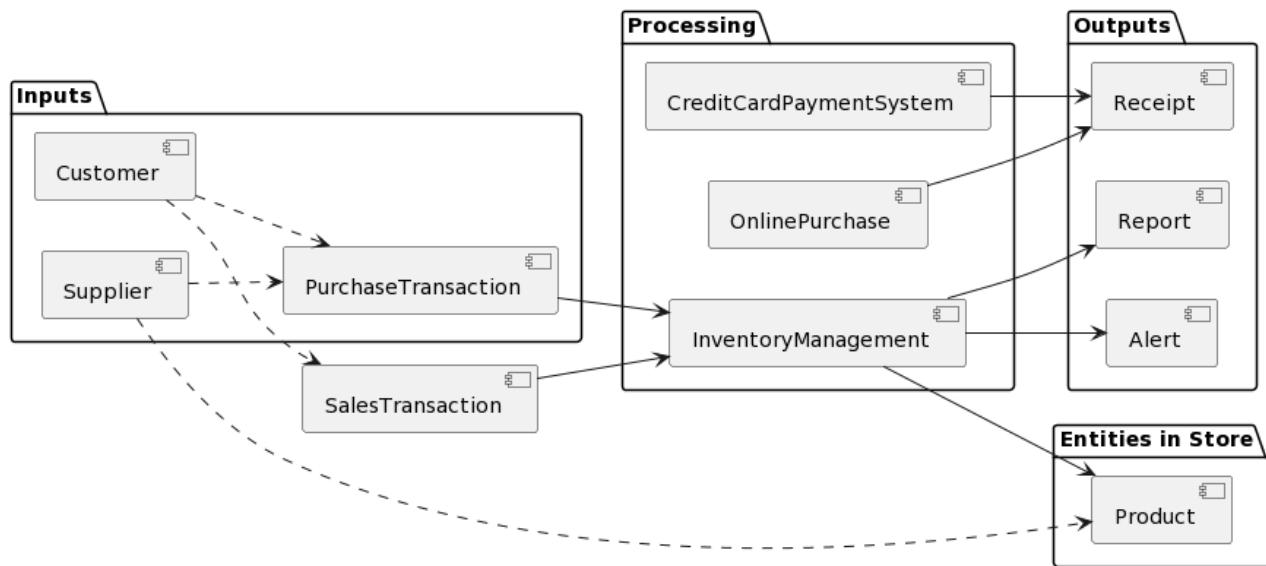
Non-Functional Requirement	Figure of Merit
Security and Access Control	Authentication success rate Authorization response time Number of failed login attempts per unit time
Performance	Transactions per second (TPS) Response time for user interactions Server throughput CPU and memory utilization under load
Reliability	Mean Time Between Failures (MTBF) Mean Time To Failure (MTTF) Mean Time To Repair (MTTR) Percentage of uptime
Usability	User satisfaction score (e.g., through surveys) Time to complete common tasks Error rates during user interactions
Compatibility	Compatibility with various browsers and operating systems Integration with external systems without errors Conformance to industry standards
Scalability	Scalability factor (e.g., ratio of performance increase with increased resources) Response time under varying loads Ability to handle increasing data volume
Maintainability	Mean Time To Repair (MTTR) Code complexity metrics (e.g., Cyclomatic Complexity) Percentage of code covered by automated tests Average time to implement changes or updates

## Graphical Notations

### Use Case UML Diagram- by Adil Khan

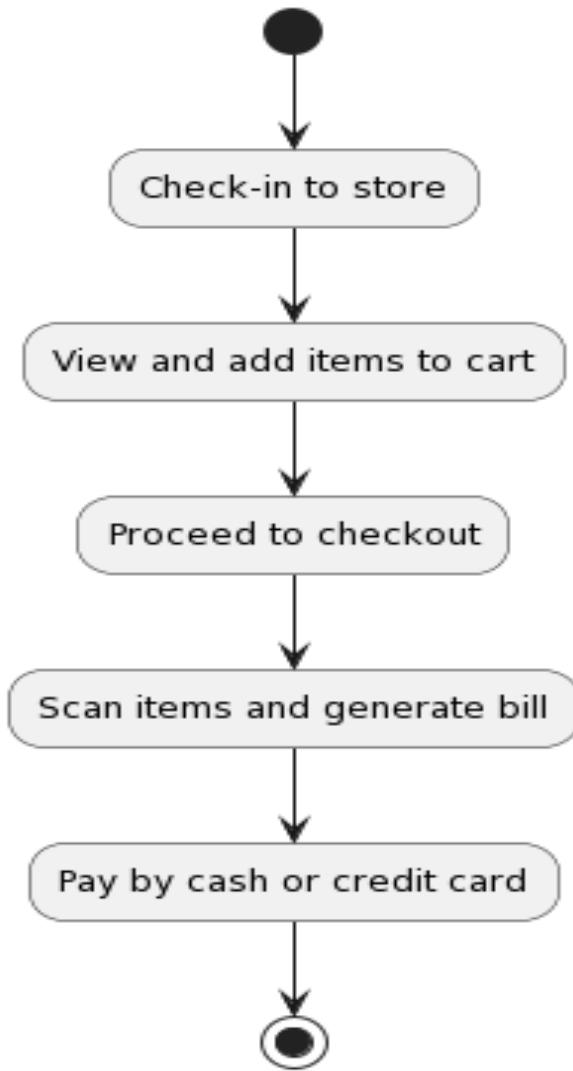
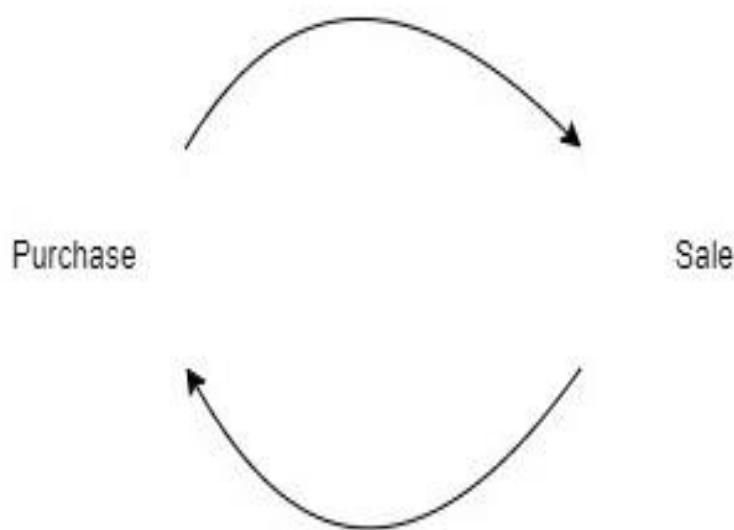


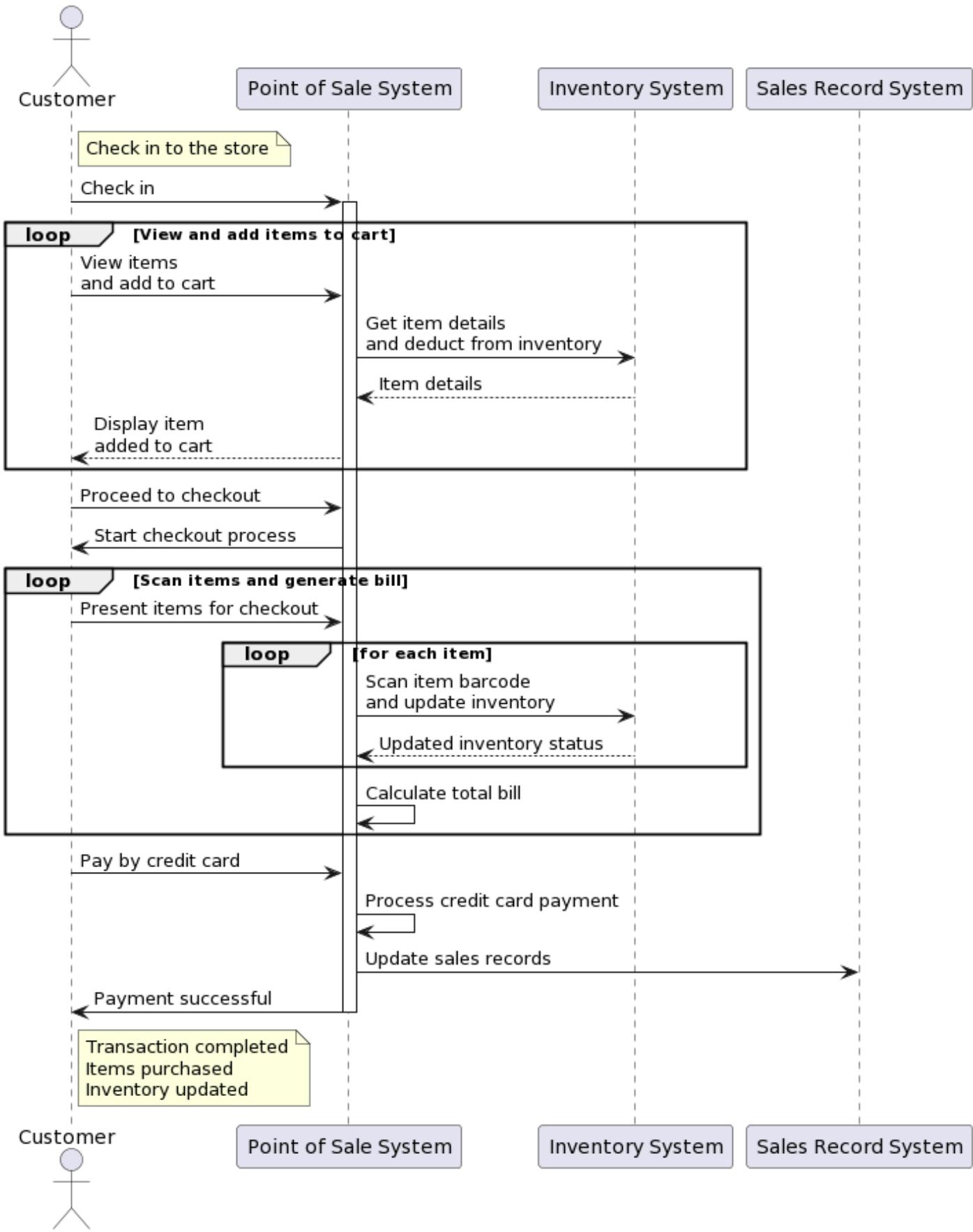
## UML Diagram of Software System:



## Flowcharts

Purchase and sale in a karyana store are in a continuous loop:





# Requirement Validation Approval Letter

Hameed Karyana store

Lala Rukh

Hameed Karyana Store  
Lala Rukh  
Wah Cantt, Pakistan

8<sup>th</sup> April, 2024

Case Dev  
CASE, B-17  
Islamabad, Pakistan

**Subject: Requirement Validation Letter for Kariana Mart Sales and Inventory Management System**

Dear Case Dev,

We are writing to formally validate the Software Requirement Specification (SRS) document provided by you for the development of a Point of Sale (POS) system for Hameed Karyana Store. We have carefully reviewed the document and are pleased to inform you that it meets our requirements and expectations for the project.

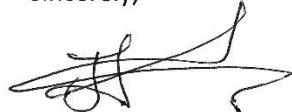
The SRS document accurately captures the functional and non-functional requirements of the POS system, including but not limited to inventory management, sales tracking, customer management, and reporting. It also includes features such as barcode scanning, integration with payment gateways, and compatibility with our existing hardware.

Additionally, the document reflects our discussions and meetings with your team, ensuring that all key aspects of the system are well-documented and understood by both parties. We appreciate the effort and attention to detail demonstrated by your team in preparing this document.

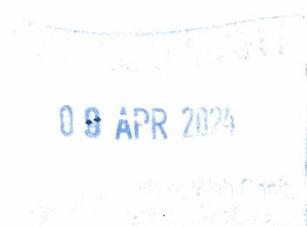
Based on our review, we confirm our acceptance of the SRS document and authorize you to proceed with the design and development phase of the Karyana software system according to the specifications outlined. We look forward to collaborating with your team and are confident that the final product will meet our expectations and contribute to the efficiency of our operations.

Thank you for your continued support and commitment to this project.

Sincerely,



Store Owner  
Hameed Karyana Store



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