

Programming Fundamentals – LAB

Instructor Name: Muhammad Nouman Hanif

Project Report



MART 1.0 MANAGEMENT SYSTEM

Section: CYS 1-A

Group Members:

24K-2002 ANAS HAIDER

24K-2000 SYED MUHAMMAD MUZAMMIL

National University of Computer & Emerging Sciences Karachi
Campus

Final Project Report: MART 1.0

1. Introduction

MART 1.0 is an innovative supermarket management system designed to streamline the operations of supermarkets. The project aims to integrate various functionalities such as inventory management, sales tracking, employee performance management, and customer interaction into a cohesive platform. By utilizing automated features and a user-friendly interface, **MART 1.0** will enhance operational efficiency and improve the overall shopping experience for customers.

2. Background

This project was chosen after extensive research on existing solutions and Existing supermarket management systems lack often rely on outdated manual processes, basic point-of-sale systems, and simple spreadsheet applications for inventory and sales tracking. These systems lack real-time data accessibility and comprehensive reporting capabilities, leading to inefficiencies in stock management and decision-making MART 1.0 bridges this gap by overcoming these loopholes. The idea emerged from existing system related like **Retail Pro**, **MobiPOS**, **Sahara PO**.

3. Project Specifications

Key Features:

MART 1.0 includes:

- User-friendly interface for easy navigation and accessibility.
- Comprehensive inventory management with real-time updates.
- Detailed sales and performance reporting features.
- Employee sales tracking and salary calculation.
- Automated discount management for event-based promotions.
- Sales history log for tracking sold items and total sales.

Technical Specifications:

- **Programming Language:** C
- **Data Handling:** File operations for storage

- **User Interface:** Text-based CLI
- **Programming Language:** C
- **Framework:** N/A (Standalone application)
- **Operating System:** Cross-platform compatibility (Windows and Linux)
- **Data Storage:** Flat-file system (e.g., inventory_data.txt)
- **Libraries:** Standard C libraries for file handling and date management.

4. Problem Analysis

The analysis of existing systems revealed several significant limitations:

- **Ineffective Inventory Control:** Manual tracking can result in inaccuracies, stockouts, or overstock situations.
- **Poor Reporting Mechanisms:** Inability to generate timely and comprehensive sales reports hinders informed decision-making.
- **Limited Employee Management:** Most systems do not effectively track employee performance or provide sales-based incentives.
- **Complex Discount Management:** Applying and managing promotional discounts, particularly during specific events, is often cumbersome and lacks automation.

5. Proposed Solution

MART 1.0 aims to address the identified problems by incorporating several new features:

- **Real-Time Inventory Management:** Automates stock level adjustments and provides alerts for low stock items.
- **Sales Tracking and Reporting:** Enables instant generation of detailed sales reports and performance metrics.
- **Employee Performance Management:** Tracks sales made by employees and calculates salaries based on performance, encouraging motivation and accountability.
- **Automated Discount Management:** Simplifies the application of promotional discounts tied to specific events, automatically resetting prices afterward.
- **Sales History Tracking:** Logs each sale, capturing details of sold items, quantities, and total sales amounts for future analysis.

6. Solution Design

The program adopts a structured design using functions to encapsulate core functionalities. MART 1.0 offers a modular design to ensure scalability and maintainability. It includes the following components:

1. Module User Login/Authentication:

This module ensures that only authorized users can access the system. It prompts the user to enter a valid username and password, verifying credentials against a stored dataset. If the credentials match, access is granted; otherwise, an error message is displayed. This module enhances the security of the system.

2. Module Inventory Management:

The inventory management module tracks and updates stock levels in real time. Users can add new products, modify existing product details (e.g., price, quantity), or remove items no longer in stock. This module ensures the accuracy of inventory data and prevents overselling or stock shortages.

3. Module Finance Section:

The finance section is designed to handle all monetary transactions and budgeting processes. It includes features such as recording sales transactions, calculating revenue, managing expenses, and generating financial summaries. This module ensures the proper tracking of financial activities, making it easier to manage profit margins and maintain accurate records for auditing purposes.

4. Module Discount:

The discount module allows the application of various discount schemes based on predefined conditions, such as percentage discounts, buy-one-get-one offers, or seasonal promotions. Users can define and activate discounts for specific products, categories, or entire purchase amounts. The module ensures that the correct discounted prices are automatically calculated during checkout, enhancing customer satisfaction and sales growth.

5. Reporting/Analytics:

This module generates detailed reports summarizing sales, inventory status, and performance metrics. Reports can be used to track sales trends, identify best-selling products, and analyze revenue data over specific time periods. This feature helps in making informed business decisions.

7. Project Breakdown Structure

Phase	Task	Timeline	Responsible Member
Phase 1	Proposal Drafting	Week 6	Anas & Muzammil
Phase 2	System Design	Week 7-8	Anas & Muzammil
Phase 3	Implementation	Week 9-10	Anas
Phase 4	Testing and debugging	Week 12	Muzammil & Anas
Phase 5	Project Finalization	Week 13	Muzammil
Phase 6	Documentation & Submission	Week 14	Muzammil

8. Demo of Mart 1.0 Management System.

Main Section:

```
=====
                        W E L C O M E   T O   M A R T   1 . 0   S Y S T E M !
=====

----- M A I N   M E N U -----
| Option   | Description
|-----|-----
| 1         | Register
| 2         | Login
| 3         | Exit
|-----|-----

Enter your choice: 1
```

Registration Section:

```
-----
                        U S E R   R E G I S T R A T I O N
-----

Enter a username: Ali
Enter a password: 123
-----

Registration successful! You can now log in.
-----
```

Login Section:

```
-----
                        U S E R   L O G I N
-----
Enter your username: ali
Enter your password: 123
-----
                        Login successful! Welcome, ali.
-----

Login successful! Loading data...
No inventory data found for user ali. Starting fresh.
```

Admin Console:

```
-----
                W E L C O M E   T O   M A R T   1 . 0   M A N A G E M E N T   S Y S T E M
-----
                        M A R T   1 . 0   A D M I N   C O N S O L E
-----
Select an option from the menu below:
-----
| 1 | Add Item to Inventory
| 2 | View Inventory
| 3 | Purchase Item (Billing)
| 4 | Remove Item
| 5 | Generate Report
| 6 | Apply Discount for Event
| 7 | Reset Discount
| 8 | Finance Section
| 9 | Show Sales History
| 10 | Sort Items by Category
| 11 | Reset Inventory (Clear All Data)
| 12 | Save and Logout
-----

Enter your choice (1-12): █
```

Adding Item to Inventory:

```
-----  
                          A D D   I T E M   T O   I N V E N T O R Y  
-----  
  
Specify item category [ e.g., Grocery, Dairy, Meat, Crockery... ]: Dairy  
Enter item name: Egg  
Enter purchase price [per item]: 20  
Enter selling price [per item]: 30  
Enter item quantity: 100  
  
Item added successfully! ID: DAI001  
Do you want to add another item? (y/n): y  
  
Specify item category [ e.g., Grocery, Dairy, Meat, Crockery... ]: Grocery  
Enter item name: Teabag  
Enter purchase price [per item]: 100  
Enter selling price [per item]: 130  
Enter item quantity: 50  
  
Item added successfully! ID: GRO002  
Do you want to add another item? (y/n): y  
  
Specify item category [ e.g., Grocery, Dairy, Meat, Crockery... ]: Meat  
Enter item name: Undercut  
Enter purchase price [per item]: 1500  
Enter selling price [per item]: 2000  
Enter item quantity: 5  
  
Item added successfully! ID: MEA003  
Do you want to add another item? (y/n): y  
  
Specify item category [ e.g., Grocery, Dairy, Meat, Crockery... ]: Grocery  
Enter item name: OliveOil  
Enter purchase price [per item]: 500  
Enter selling price [per item]: 750  
Enter item quantity: 45  
  
Item added successfully! ID: GRO004  
Do you want to add another item? (y/n): n  
  
Inventory saved successfully for user ali.  
  
-----  
                          A D D I T I O N   C O M P L E T E D  
-----
```

Display Inventory:

Enter your choice (1-12): 2

I N V E N T O R Y

ID	Name	Category	Price	Quantity	Stock Alert
DAI001	Egg	Dairy	\$30.00	100	
GRO002	Teabag	Grocery	\$130.00	50	
MEA003	Undercut	Meat	\$2000.00	5	LOW STOCK
GRO004	OliveOil	Grocery	\$750.00	45	

Sell Item [scanning item bar code]:

S E L L I N G I T E M (B I L L I N G C O U N T E R)

Enter item ID to be scan: DAI001

Enter quantity: 10

Item sold successfully! Total price: 300.00

Inventory saved successfully for user ali.

Do you want to scan another item? (y/n): y

Enter item ID to be scan: GRO004

Enter quantity: 5

Item sold successfully! Total price: 3750.00

Inventory saved successfully for user ali.

Do you want to scan another item? (y/n): y

Enter item ID to be scan: MEA003

Enter quantity: 2

Item sold successfully! Total price: 4000.00

Inventory saved successfully for user ali.

Do you want to scan another item? (y/n): y

Enter item ID to be scan: GRO008

Enter quantity: 1

Invalid item ID. Please try again.

Do you want to scan another item? (y/n): n

Remove items for Inventory:

```
Enter your choice (1-12): 4

-----
                REMOVE ITEM FROM INVENTORY
-----

Enter item ID to remove: MEA003
Item removed successfully!

Inventory saved successfully for user ali.
Do you want to remove another item? (y/n): n
```

Shows updated Inventory:

I N V E N T O R Y					
ID	Name	Category	Price	Quantity	Stock Alert
DAI001	Egg	Dairy	\$30.00	90	
GRO002	Teabag	Grocery	\$130.00	50	
GRO004	OliveOil	Grocery	\$750.00	40	

Sales Report Generator:

S A L E S R E P O R T					
ID	Name	Category	Sold Quantity	Profit	
DAI001	Egg	Dairy	10	\$100.00	
GRO004	OliveOil	Grocery	5	\$1250.00	
Total Profit				\$2350.00	

Apply Discount:

```
Enter your choice (1-12): 6

-----
                APPLY DISCOUNT FOR EVENT
-----

Enter the event date (YYYY MM DD): 2024 12 25

[Success] A 10% discount has been successfully applied to all items.

Inventory saved successfully for user ali.
```

Shows Error on past date:

APPLY DISCOUNT FOR EVENT

Enter the event date (YYYY MM DD): 2024 06 24

[Error] The event date has already passed. No discount can be applied.

Remove Discount on Items:

Enter your choice (1-12): 7

RESET DISCOUNT TO ORIGINAL PRICES

[Success] All discounts have been removed. Original prices have been restored for all items.

Inventory saved successfully for user ali.

Finance Section:

Enter your choice (1-12): 8

FINANCIAL OVERVIEW

ID	Name	Category	Purchase Price	Selling Price	Profit
GRO001	OliveOil	Grocery	\$1000.00	\$1200.00	\$4600.00
DAI002	Butter	Dairy	\$100.00	\$150.00	\$0.00
MEA003	UnderCut	Meat	\$1000.00	\$1300.00	\$0.00
CRO004	Spoon	Crockery	\$60.00	\$80.00	\$0.00
GRO005	TeaBag	Grocery	\$150.00	\$200.00	\$0.00
DAI006	Milk	Dairy	\$100.00	\$120.00	\$1220.00

Total Profit: \$4840.00

EMPLOYEE SALARIES

Salary (15% of Total Profit)	Total: \$726.00
------------------------------	-----------------

Shows Items Sold History Section:

Enter your choice (1-12): 9

S A L E S H I S T O R Y				
Item ID	Item Name	Quantity Sold	Total Amount	
DAI001	Egg	10	\$300.00	
GRO004	OliveOil	5	\$3750.00	
MEA003	Undercut	2	\$4000.00	
		Total Entries: 3		

Sort Items by Category:

Enter your choice (1-12): 10

S O R T I T E M S B Y C A T E G O R Y					
[Success] Items have been sorted by category. Here is the updated inventory:					
I N V E N T O R Y					
ID	Name	Category	Price	Quantity	Stock Alert
DAI001	Egg	Dairy	\$30.00	90	
GRO002	Teabag	Grocery	\$130.00	50	
GRO004	OliveOil	Grocery	\$750.00	40	

Reset Inventory:

Enter your choice (1-12): 11

R E S E T E N T I R E I N V E N T O R Y				
Are you sure you want to reset the entire inventory? (y/n): y				
[Success] Inventory has been reset! All data has been cleared.				
Inventory saved successfully for user ali.				

Inventory after resetting:

I N V E N T O R Y					
ID	Name	Category	Price	Quantity	Stock Alert

Logout & Save Section:

```
| 12 | Save and Logout
-----

Enter your choice (1-12): 12

Inventory saved successfully for user ali.
-----

                L O G G I N G   O U T   G O O D B Y E , a l i !
-----

                Designed by Muzammil & Co-Developed by Anas
```

Exiting the system:

```
=====
                W E L C O M E   T O   M A R T   1 . 0   S Y S T E M !
=====

----- M A I N   M E N U -----
| Option | Description
-----
| 1      | Register
| 2      | Login
| 3      | Exit
-----

Enter your choice: 3

-----

                E X I T I N G   T H E   S Y S T E M
                Thank you for using MART System.
-----

                Designed by Muzammil & Co-Developed by Anas
-----
```

9. Conclusion

In conclusion, MART 1.0 has been designed and developed as a comprehensive solution to streamline the management of retail operations. With its modular structure, including features like user authentication, inventory management, finance tracking, discount implementation, and reporting analytics, the system provides a scalable and user-friendly platform for retail businesses. Through rigorous problem analysis, solution design, and implementation, the project effectively addresses the challenges of manual management by introducing automation and enhanced accuracy. The inclusion of a finance section and discount module adds value by improving financial transparency and boosting customer satisfaction through dynamic pricing strategies. This project represents a step forward in optimizing operational efficiency and is poised to support small to medium-sized enterprises in achieving their business goals.