Vivekanand Education Society's Institute Of Technology
Department Of Information Technology
DSA mini Project
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Title: Pharmacy Inventory Management System

Domain: Data Structures and Algorithm

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Div:D10B

Roll No.:37


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Content

Introduction to Project

The **Pharmacy Inventory Management System** is a mini project developed in **C language** as a part of the **Data Structures and Algorithms(DSA)** course .

This project simulates a real-world pharmacy inventory system while emphasizing **efficient data handling** using fundamental Data Structures.

- **Arrays** used for basic record handling
- **Linked List** used for storing medicines
- **Stack** used for recording sales
- **Queue** used for supplier orders

Problem Statement

Managing a pharmacy manually is **time-consuming** and prone to **errors**, especially in tracking medicine stock, sales, expiry dates, and customer billing. Traditional methods make it **difficult to quickly update records, undo mistakes, or efficiently handle multiple customers.**

The system needs a **computerized solution** that uses data structures to manage medicines, sales, and billing **efficiently, ensuring accuracy, speed,** and **reliability** in day-to-day pharmacy operations.

Objectives of the project

- Efficiently manage medicine stock and records
- Track expiry dates to prevent sale of expired medicines
- Handle customer billing and maintain transactions
- Implement Arrays, Linked Lists, Stacks, and Queues for data management
- Reduce manual errors and streamline pharmacy operations

Scope of the Project

- Efficiently manage medicine inventory for pharmacies.
- Track sales and generate reports for business insights.
- Monitor expiry dates to reduce wastage.
- Handle supplier orders with FIFO management.
- Can be extended to include billing, alerts, and database integration.
- Useful for small to medium pharmacies and real-time inventory control.

Requirements of the system (Hardware, software)

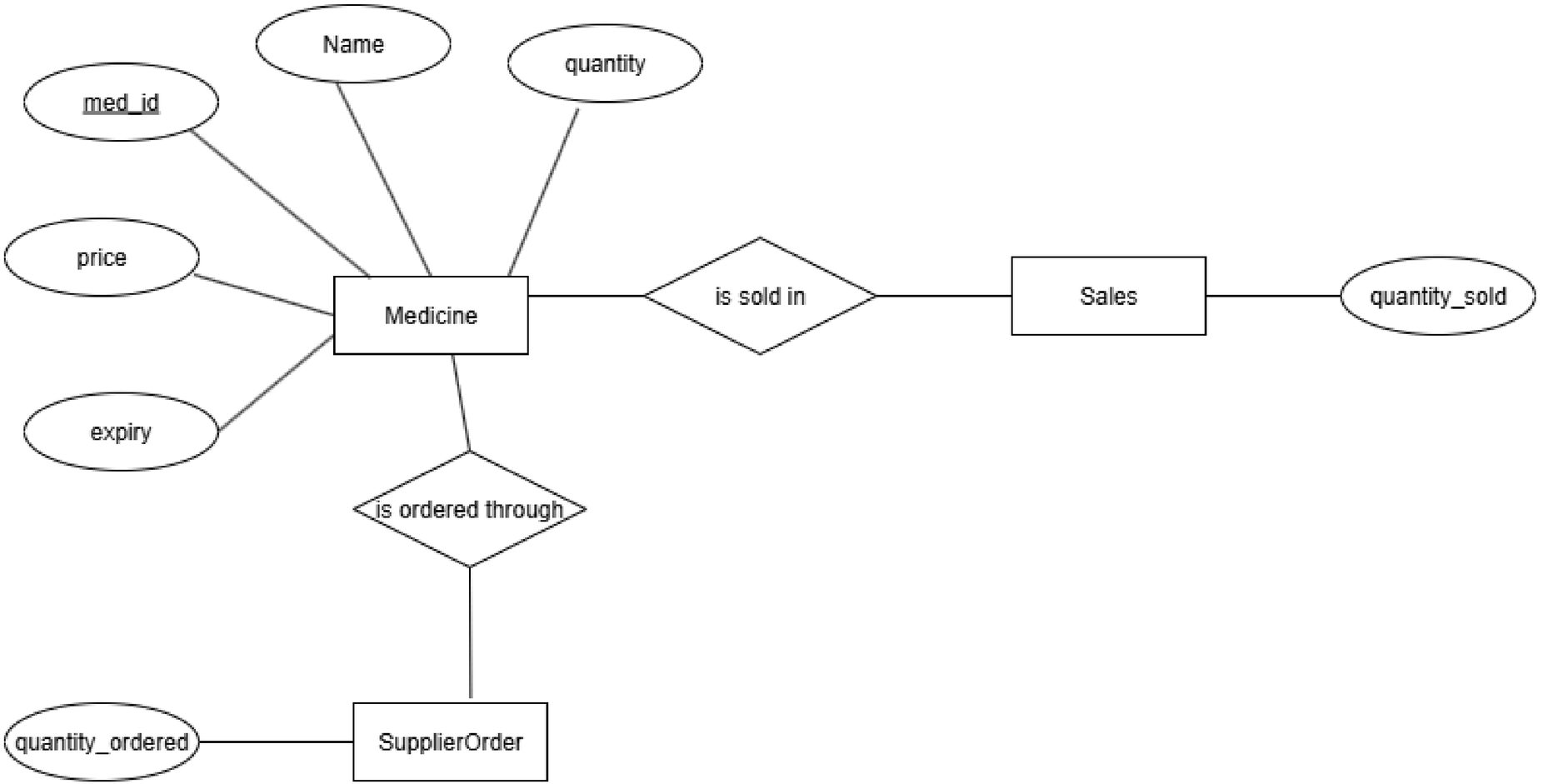
Hardware:

- Intel i3 processor (or above), 2 GB RAM, 200 MB storage
- Standard monitor, keyboard, and mouse

Software:

1. OS: Windows / Linux
2. C Compiler (GCC / Turbo C / Code::Blocks)

ER diagram of the proposed system



Data Structures and Concepts Used

- **Arrays** : Used for storing and handling simple, fixed-size records like basic medicine details.
- **Linked List** : Provides dynamic memory management for storing medicines, allowing easy insertion and deletion.
- **Stack** :Records sales using stack, following the LIFO (Last In, First Out) principle.
- **Queue** : Used in supplier orders to ensure FIFO (First In, First Out) processing of customers.

Algorithm Explanation

- Start: Initialize linked lists for Medicines, Sales (stack), and Supplier Orders (queue).
- Main Menu Loop: Display options and take user choice.
- Add Medicine: Create a node and insert at head of medicine list.
- Display/Search/Update/Delete Medicine: Traverse list and perform action.
- Sell Medicine: Reduce stock, push sale details onto stack.
- Check Expiry: Compare current date with expiry, show expired items.
- Generate Report: Traverse list, calculate total stock value.
- Supplier Orders: Add to queue, display in FIFO order.
- Exit:End Program.

Time and Space Complexity

1)Time Complexity:

- Add Medicine, Record Sale, Add Supplier Order → O(1)
- Search, Update, Delete, Sell, Check Expiry, Generate Report → O(n)

2)Space Complexity:

- Medicines List → O(n)
- Sales Stack → O(s)
- Supplier Orders Queue → O(q)
- Total → O(n + s + q) ,

where n → Number of medicines in the inventory

s → Number of sales recorded

q → Number of pending supplier orders

Front End

1. Console-based system with a clean, menu-driven design
2. Provides easy text-based interaction for users
3. Features:
    - Manage medicines (Add, View, Search, Update, Delete)
    - Supplier orders through queue
    - Records sale using stack
    - Track and manage expiry dates
4. Designed for simplicity and efficiency rather than complex GUI

Future Scope

- Integration with database systems (MySQL/Oracle) for persistent storage.
- Adding a Graphical User Interface (GUI) for better usability
- Integration with online pharmacy portals for real-time orders.
- Enhanced security and authentication for sensitive data.
- Support for data analytics & reporting

Conclusion

- Implemented a Pharmacy Inventory System using C and DSA concepts.
- Managed medicines with Linked List, sales with Stack, and supplier orders with Queue.
- Provided features like add, update, delete, search, sell, expiry check, and reports.
- Improved efficiency and reduced manual errors in inventory management.
- Can be extended with billing, alerts, and database integration.

References

- E. Balagurusamy, Programming in ANSI C, 8th ed., McGraw Hill, 2019.
- GeeksforGeeks, “DSA Implementation in C,” [Online]. Available: https://www.geeksforgeeks.org