UNIVERSITY OF GHANA

COMPUTER SCIENE DEPARTMENT

DATA STRUCTURE AND ALGORITHM II

DCIT 308

GROUP PROJECT WORK

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PHARMACY MANAGEMENT SYSTEM DOCUMENTATION

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1. Introduction

The Pharmacy Management System is a semester-long project that aims to show how different data structures and algorithms can be used to efficiently manage pharmaceuticals, purchase histories, suppliers, and clients in a neighborhood drugstore. Pharmacists can use the system to add medications, look up medication specifics, manage suppliers, and keep track of past purchases, which include precise information about the time, date, and purchaser. The project uses a relational database backend (MySQL, MSSQL, PostgreSQL, or Oracle) for data storage and is developed in Java with an interactive user interface using JavaFX.

2. System Overview

With the help of the Pharmacy Management System, pharmacists will be able to manage medications and associated data efficiently. Pharmacists have the ability to add new medications to the system, remove existing medications, look up specific medications, view all medications and their suppliers, view purchase histories, and track drug sales. Additionally, the system keeps a balanced stock level and produces reports to assess the effectiveness of the data structure.

3. System Features

The key features:

Add drugs: Pharmacists can enter new medications into the system by entering pertinent information such as the drug's code, name, price, quantity, and suppliers.

Search for a drug: Pharmacists will use drug code or name to search for specific drugs.

View drugs and their suppliers: Pharmacists uses this to view a list of all drugs and their respective suppliers.

View purchase history: Each medicine has a detailed purchase history that is available, including the time, date, and buyer.

Link drugs to suppliers: using appropriate data structures for efficient searching,

 drugs can be linked to a group of suppliers

Maintain stock balance: By sending out alerts whenever necessary, the system maintains a proper balance between high and low stock levels.

Generate reports: The system produces reports to demonstrate how well data structure implementations perform.

4. Data Structures Used

data structures utilized in the system:

HashMap: Employing the drug code as the key and the drug information as the value, to represent the collection of pharmaceuticals in the system.

ArrayList: To keep track of medicine purchase data, allowing for sorting by date, time, and total cost per transaction.

TreeMap and PriorityQueue: to implement sorting based on the time and date of the purchase as well as the overall cost per purchase.

HashMap and HashSet: To link each and every drug to a group of suppliers and keep information about customers and suppliers.

5. Implementation Details

Here are some key classes out of several classes of the system:

PharmacyManagementSystem: the Main class have methods that adds, remove, and search for drugs, and also responsible for managing purchase history, linking drugs to suppliers, and recording drug sales.

Drug: showcases drugs individually with attributes such as drug code, name, quantity, price, and suppliers.

PurchaseHistory: specifies purchase history with details like drug code, purchase date, buyer, and total amount.

6. User Interface

To give pharmacists an interactive experience, the system's user interface is built using JavaFX. The user interface makes it simple for users to enter drug information, look up drugs, read drug information, and do other tasks.

7. Database Backend

Data storage and retrieval for the Pharmacy Management System are handled by a relational database backend (MySQL). Data persistence is ensured through the database's storage of medicine specifics, purchase history, supplier data, and customer data.

8. Performance Analysis

Using Big O and Omega Notations, the system evaluates the performance of data structures and algorithms. To ensure effective operations, performance indicators including temporal complexity and spatial complexity are assessed.

9. Conclusion

Pharmacists can successfully manage drug-related information thanks to the comprehensive and robust Pharmacy Management System. Smooth operations are ensured because we used the appropriate data structures and algorithms, also we design an intuitive user interface. The system's usefulness for pharmacy administration is increased by its capacity to keep track of stock balance and provide reports.

10. References

[Java Foundations Introduction to Program Design and Data Structures 5th edition]

[John_Lewis,_Peter_DePasquale, _Joseph_Chase__Java__z-lib.org_.pdf]

We also made use of youtube videos for the UI design.