*DCIT 308 GROUP PROJECT*

*Gazi.Vs*

The Pharmacy Management System is a comprehensive piece of software that was developed to streamline and simplify several operations in a neighbourhood pharmacy. This study provides an overview of the system's implementation, data structures, sorting algorithms, and functionalities. It also includes a performance analysis of significant algorithms using Big O and Omega Notation.

**Data Structures:**

The Pharmacy Management System uses a range of data structures to manage the pharmacy's data effectively.

List: Used to show the history of purchases, the low stock queue, and the variety of pharmaceuticals in the system.

Map (HashMap): Used to keep track of pharmaceutical sales and to store information about clients and suppliers.

Priority Queue (Heap) was implemented as the low stock queue in order to maintain a balanced stock level.

Set: Used to maintain tabs on numerous unique suppliers.

**Functionalities:**

The following functions are accessible to chemists through the pharmacy management system:

**Drug Adding and Subtracting:** Pharmacists can add and remove drugs from the inventory by using the system, which allows them to enter the drug's code, name, quantity, price, and supplier code. The code of a medicine can be utilised to get rid of it.

**Drug Searching:** Pharmacists can submit a query, which can be either a drug code or a drug name, to find drugs. The search algorithm's linear search strategy provides a practical way to find drugs that match.

**Viewing All Drugs and Their Suppliers**: Pharmacists have access to a comprehensive list of all medications and the suppliers who provide them. When the system loops through the list of pharmaceuticals, the supplier code is used to obtain supplier information.

**Viewing Purchase History:** The system allows chemists to view the history of each drug's acquisitions. Past transactions are listed in records along with details such the pharmaceutical code, buyer's name, quantity purchased, total money, and date of purchase. The data is presented in a clear fashion.

**Connecting Suppliers to Drugs:** Pharmacists can establish connections between drugs and the right suppliers. When adding a new medication, the chemist must enter the supplier code to connect the drug to its maker.

**Finding Suppliers Considering Location:** Pharmacists can do supplier searches based on the provider's location. Using a location-based search algorithm, the system efficiently identifies providers whose locations match the search parameters.

**Stock Administration:** The pharmacy management system's stock management capabilities aid in preserving a healthy balance between high and low stock. The low stock queue (implemented as a priority queue) efficiently tracks medications with quantities below the reorder point, ensuring rapid resupply.

**Generating Reports:** The system generates reports to show how the data structure is implemented. The low stock queue is used in the stock level report to display drugs with low stock levels. The sales report is built on top of the drugSalesMap, which accurately tracks how frequently each medication is sold.

**Sorting Algorithms:** The Pharmacy Management System uses sorting algorithms to efficiently organise data:

**Arranging records of purchases**: The purchase history list is sorted based on the time and date of transactions, together with the total amount paid. In the sorting process, Java's built-in sorting technique is used, which has an O(n log n) time complexity.

**Performance Evaluation**

**We** **used** **Big-O** and Omega **notation** **to** **examine** the performance **of** **key** **algorithms** **in** **pharmacy** **management** **systems.**  
  
1.The time complexity of the algorithm for finding drug suppliers is O(n) in the worst case and (1) in the best scenario.  
2. The average and worst-case time complexity of the method used to sort the purchase history is O(n log n).  
3. For queuing and dequeuing, the time complexity of the priority queue inventory control procedure is O(log n).  
4. For inserts and retrieves, the average time complexity of DrugSalesMap operations is O(1).

**Conclusion**

Offering a user-friendly interface, pharmacy management systems efficiently meet the needs of managing pharmaceutical inventory, tracking purchase history, and maintaining optimal inventory levels. This implementation uses appropriate data structures, sorting algorithms, and features to provide an effective solution for field pharmacies. Performance analysis of the system confirms its suitability for real tasks in pharmacy management.  
This report provides a detailed analysis of the pharmacy management system design, data structures, sorting algorithms and functionality based on the Java code implemented.

Group Members

Henry Crentsil 10889048

Jesse Asiedu 10916584

Henry Padi Dromor 10905050

Michael Benyah 10690389

Keside Onyechi 10758119