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REPORT ON INVENTORY MANAGEMENT SYSTEM

INTRODUCTION

This paper describes the deployment of an inventory management system for a convenience shop. The system was created with the Java programming language and the MySQL database. It allows the business owner to add items, see suppliers, view goods, view invoices, manage issued goods, and generate reports. The solution follows the specifications and makes use of data structures, algorithms, and database principles to enable efficient and accurate store inventory management.

1. **System Architecture:**
   The system is built on a client-server design, with the client using Java and the server utilizing MySQL as the database management system. To conduct CRUD (Create, Read, Update, Delete) actions on the inventory data, the client talks with the server using JDBC (Java Database Connectivity).

2. **Data Structures:**
   Depending on the item categories, multiple data structures are used to efficiently organize and manage the inventory. The following data structures were put in place:

   a) **Stacks (Categories 1 to 4):**
   Stacks were utilized to manage the addition and removal of items from the beverage, bread/bakery, canned/jarred foods, and dairy product categories. The stack data structure enforces Last-In-First-Out (LIFO) behavior, making it simple to check stock levels and manage product expiry dates.

   b) **Queues (Categories 5 to 7):**
   Queues were put in place to manage frozen goods, meat, and other relevant categories. Queues adhere to the First-In-First-Out (FIFO) principle, enabling for efficient stock turnover and guaranteeing that older products sell first.

   c) **Lists (Categories 8 to 11):**
   Farm produce, house cleansers, paper items, and home care supplies were all managed using lists. Lists provide effective inventory management by allowing for the addition and removal of items at any point.

   d) **Maps and HashMaps:**

Maps and HashMaps were used to store vendor and product sales information. Product sales were tracked using a map, with each sale documented by inserting the product code into a sales file. To store vendor information, HashMaps were employed, allowing for rapid access and change of vendor details.

3. **Reports and Analysis:**
   The system features report creation capability to give inventory and performance analysis information. The following reports were put into action:

   a) **Data Structure Performance Reports:**
   The system creates reports that indicate how various data structures (stacks, queues, and lists) are used for various categories. These reports illustrate the efficiency and usefulness of the selected data structures in inventory management.

   b) **Sales Reports:**
   Reports are created to display sales data such as amount sold, income produced, and popular goods. This allows the business owner to examine sales patterns, discover hot goods, and make smart stock replenishment decisions.

4. **Searching and Sorting Algorithms:**
   To improve inventory management, searching and sorting algorithms were introduced in categories 6–11. To search for specific goods and sort products based on multiple criteria (e.g., name, price, expiration date), efficient algorithms such as binary search and quicksort were used.

5. **Performance Analysis:**
   Big O Notation and Omega Notation were used to analyze the system's performance, which give insights into the efficiency and scalability of the developed algorithms. The investigation took into account elements such as time complexity, space complexity, and overall system performance for various inventory quantities.

CONCLUSION

The inventory management system that was installed effectively met the criteria for a provision store. To ensure effective stock management, create reports, and assist vendor and sales tracking, it employs appropriate data structures, searching and sorting algorithms, and database principles. The system's inclusion of these elements enables the business owner to manage ideal inventory levels, make data-driven choices, and deliver exceptional customer service.