

CHRIST (Deemed to be University)
Department of Computer Science
Master of Artificial Intelligence and Machine Learning

Course: MAI271 – JAVA Programming

Exercise No: LAB Exercise – 7

Date: 6 – 01 – 2024

Duration: 2 Hrs

Question (10 Marks)

In the ongoing advancement of Amazon's customer relationship management infrastructure, a sophisticated and menu-driven application is being meticulously crafted to streamline customer data management and optimize order processing. This system employs key classes tailored for Amazon's expansive ecosystem: Customer, Product, and Order. The Customer class, a linchpin of the system, adeptly manages individual customer details and interactions, providing functionalities for seamless registration and updating of customer information. Simultaneously, the Product class, acting as the backbone of the organization's dynamic product catalog and inventory management, boasts capabilities for the addition and real-time modification of product details. The Order class, serving as a robust facilitator for efficient order processing and tracking, offers features to place and modify orders while retrieving comprehensive order history. To bolster the efficiency of data storage and retrieval, the system strategically incorporates various data structures.

The ArrayList data structure is instrumental in managing dynamic lists of customers, products, and orders. It facilitates adaptive storage, allowing for the dynamic expansion or contraction of lists based on operational needs, ensuring flexibility and responsiveness within Amazon's dynamic environment. Meanwhile, the HashMap data structure ensures unique identification and swift retrieval of products and customers. This is paramount for Amazon's vast database, as it allows for rapid access to pertinent information, minimizing latency and enhancing the overall responsiveness of the system. The HashSet data structure finds its purpose in efficiently organizing unique products associated with each customer. By eliminating duplicates and providing a structure for a collection of unique elements, it streamlines data representation, offering a more concise and organized view. Lastly, the TreeSet data structure plays a crucial role in ordered sorting of customers or products, facilitating efficient retrieval of information based on natural ordering or custom comparators. This is particularly beneficial in scenarios where sorted data access is integral to certain operational processes within Amazon.

This strategic integration of ArrayList, HashMap, HashSet, and TreeSet underscores Amazon's commitment to technological innovation and scalability. These data structures collectively contribute to the optimization of data storage, retrieval, and management, aligning seamlessly

with Amazon's commitment to delivering a customer-centric and operationally efficient experience within its vast and dynamic landscape.

Evaluation Rubrics:

Implementation of ArrayList:2 Marks

Implementation of HashMap:4 Marks

Implementation of HashSet and TreeSet:4 Marks

Total:10 Marks

General Instruction:

1. Ensure that your code includes relevant comments to enhance readability and understanding. Subsequently, upload your code to GitHub for version control and collaborative access.
2. Include descriptive comments within the code, explaining its functionality and logic.
3. In the Google Classroom submission, include the GitHub URL where your code is hosted.
4. Attach a PDF document named "your_register_number_exercise_No.pdf" to the submission. The PDF document should include screenshots of the code and the output screen.
5. Upload the answer document&GitHub URL in Google Classroom on or before the deadline mentioned. Evaluation will not be considered for late submission