DATA STRUCTURES FINAL PROJECT REPORT

DOCUMENT

CSE 228 DATA STRUCTURES

TOPIC: GROCERY STORE SIMULATION

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Introduction:

The Grocery Store Simulation project is designed to provide an immersive simulation of a grocery store environment, modeling the interactions between customers, products, and store inventory. Its primary purpose is to offer a hands-on educational experience in object-oriented programming, data structures, and user interaction through Java.

Functionalities:

Customer Management:

1. *Simulate Customer Arrivals: The project allows for the dynamic simulation of customer arrivals, enabling users to input customer names, budgets, and shopping lists. Each customer is allocated a random budget, and they can create a shopping list with a variable number of products.*

2. *Customer Class: A dedicated Customer class has been implemented to encapsulate essential customer information, including names, budgets, and shopping lists.*

Product Inventory:

1. *Maintain Store Inventory: The project effectively manages a store inventory using a HashMap data structure. Each product within the inventory is represented by the Product class, featuring attributes like name, price, available quantity, and category.*

2. *Category Management: To organize the inventory systematically, products are categorized, with category information stored within the Category class.*

Shopping Simulation:

1. *Add Products to Shopping Cart: Customers have the flexibility to add products to their shopping carts. The simulation ensures product availability and affordability by verifying items against the inventory and the customer's budget.*

2. Update Inventory: As customers add products to their carts, the inventory is dynamically updated to reflect the reduction in available quantities.

Checkout:

1. Calculate Total Cost: At the checkout stage, the project accurately computes the total cost of the items in the customer's shopping cart.

2. Deduct Cost from Budget: Subsequently, the total cost is deducted from the customer's allocated budget.

3. Update Inventory: The inventory is continually updated to reflect the purchase of items, ensuring accurate stock management.

Code Structure:

The code is thoughtfully organized into distinct classes, each responsible for specific functionalities:

- Product: Represents individual products and includes attributes such as name, price, quantity, unit, and category.

- Category: Facilitates the categorization of products, providing structured organization within the inventory.

- *Customer: Represents individual customers and encapsulates attributes including names, budgets, and shopping lists.*

- *GroceryStoreSimulation: This class acts as the core of the simulation, housing the primary logic for simulating customer interactions, inventory management, and the checkout process.*

The project harnesses Java's standard utility classes for user input and leverages data structures such as HashMap and LinkedList to facilitate smooth operations.

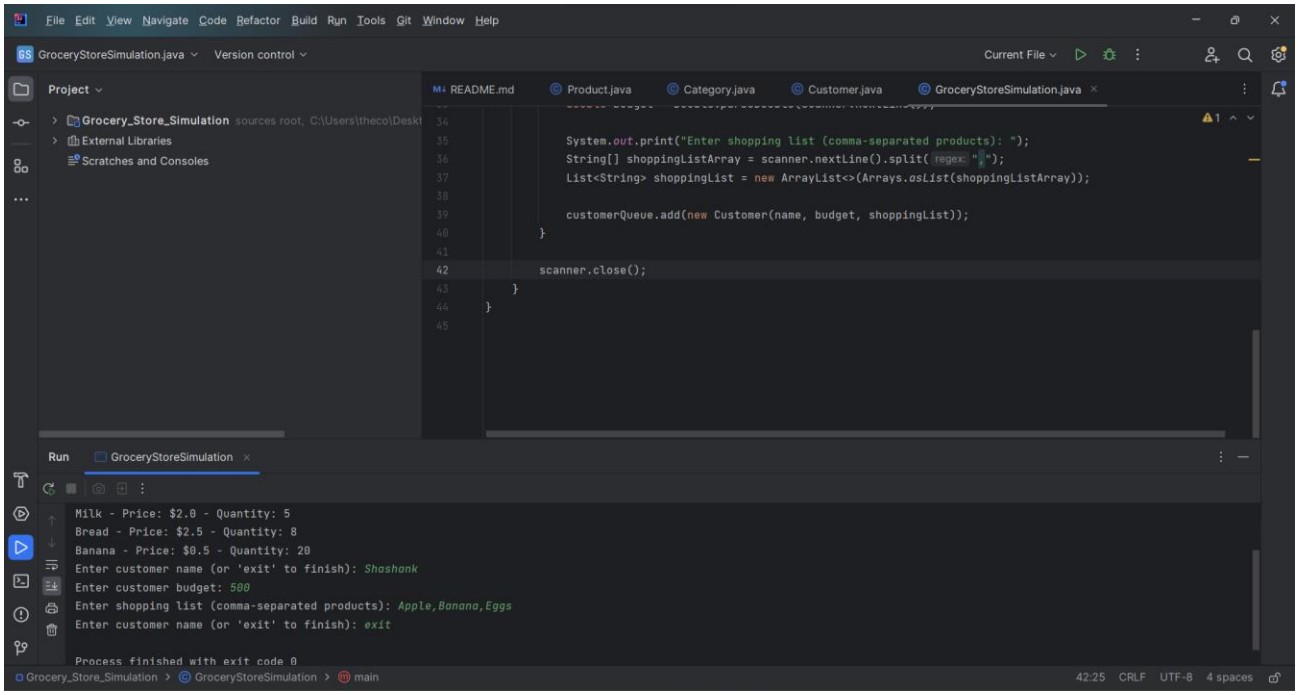
Conclusion:

The Grocery Store Simulation project offers a rich and immersive learning experience in Java programming. It comprehensively covers essential concepts such as object-oriented programming, data structures, and user interaction. While the current implementation forms a robust foundation, there exists significant scope for further enhancements. Future developments may include the introduction of discounts, promotions, and advanced inventory management features to make the simulation even more realistic and functional. Overall, this project serves as a valuable exercise in building a simplified yet highly functional grocery store simulation.

**Thank you for exploring the Grocery Store Simulation project report. We hope you've enjoyed your journey through this educational and*

interactive simulation. Please consider returning for more engaging experiences in the future.*

Output:-



GitHub Repository: [shashanksingh71/Grocery_Store_Simulation: DSA Project 2nd Year (github.com)]