CADT Anniversary

FINAL
REPORT

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Coffee Shop System

GROUP 8
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Objective

This project is a coffee shop management system that helps handle customers orders, keeps track of their purchase history, and allows managing orders more effectively. It’s designed to save time for both the coffee shop staff and customers by automating the ordering and record-keeping process.

1- Problem Definition and Requirements

Coffee shops often need an easy way to manage customer orders and keep track of their purchase history.

The system management must need:

- Taking new order
- Showing customers order history
- Print Invoice for customers
- Cancelling orders

2- Abstract Data Type (ADT) Selection

To manage the operations of the coffee shop efficiently, we have chosen the following Abstract Data Types (ADTs):

1. **Queue**:
   - **Purpose**: Manage customer orders based on the "First-In-First-Out" (FIFO) principle. This ensures that the customer who places an order first is served first.
2. **Node**:
   - **Purpose**: Represent a menu item with attributes such as name, price, and description.
3. **Stack**:
   - **Purpose**: Handle undo operations, such as canceling the last order or reversing a stock update.
4. **Array**:
   - **Purpose**: Store and retrieve data such as customer purchase history or the list of available menu items.

3- Implementation Details

This project is a coffee shop management system that helps handle customers orders, keeps track of their purchase history, and allows managing orders more effectively. It’s designed to save time for both the coffee shop staff and customers by automating the ordering and record-keeping process.

4.1- Data Structure(s)

- **Customer Data**: Stored in arrays that include the customer's name, phone number, and purchase history.
- **Order History**: Each customer has an array to store their list of orders.
- **File Storage**: All customer data is saved into a file so it’s not lost when the system shuts down.

4.2- Key algorithms

1. **Placing an Order**:
    - Input: Coffee type, quantity, and timestamp.
    - Process: Saves the order details in the customer’s history and updates the total purchase count.
    - Output: Confirms the order and updates the file.
2. **Cancelling an Order**:
    - Input: The order number to cancel.
    - Process: Marks the specific order as canceled.
    - Output: Updates the history and shows confirmation.

4- Performance Analysis

- > **Speed**:

. Adding or canceling orders is very fast because the system directly accesses the data.

. Searching through a customer’s history takes more time as it grows but is still manageable.

-> **Space**:

. The system uses arrays, so it’s efficient for a limited number of customers and orders.

. Larger systems may need better data structures, like dynamic arrays or databases

5- Results and Discussion

The system successfully manages orders and stores all data for future use. It’s easy to add new features, and the performance is good for smaller coffee shops. However, as the number of customers grows, the fixed-size arrays may become a limitation.

6- Challenges and Future Improvements

Challenges:

- Managing multiple customers with different order histories.
- Avoiding data errors during cancellation or file saving.

Improvements:

1. Use dynamic data structures like lists for scalability.
2. Save data in a database or structured file format for better reliability.
3. Add a user-friendly interface to make it easier for staff to use.

7- References

- https://www.geeksforgeeks.org/dsa-tutorial-learn-data-structures-and-algorithms/
- https://www.w3schools.com/cpp/cpp_files.asp
- https://github.com/tahaeii/Cofee-Shop

Photo after we had discussed our project