INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD

Semester Project:

Data Structure & Algorithm (DS&A)

Topic:-

E-Commerce Cart & Checkout System

Submitted By:

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SAM E-Commerce Store - Project Documentation

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1. Introduction

The SAM E-Commerce Store is a C++ terminal-based project developed as a semester project for the Data Structures and Algorithms (DS&A) course. It simulates the basic operations of an online store, supporting both customer and admin roles. The project incorporates several core data structures, object-oriented programming principles, and file handling for persistent storage.

2. System Overview

This e-commerce application allows:

- **Admins** to manage product listings
- **Customers** to browse, search, sort, add items to cart, undo actions, and checkout

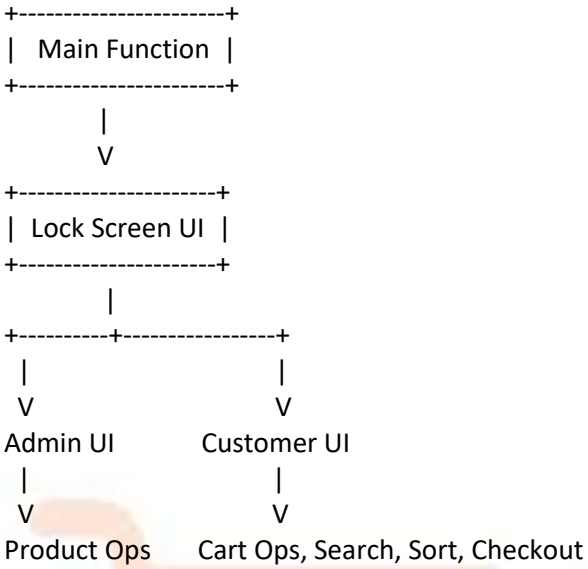
The system uses a console-based interface with role-based access.

3. Key Features

- Login/Registration System
- Product Management (Add, Edit, Delete, Display)
- Customer Cart with Undo Feature
- Checkout with Receipt
- Product Sorting and Searching

- Persistent Data Storage using Files
- OOP Principles: Classes for Cart, Product Catalog, UI, Undo Stack

4. System Architecture



5. Data Structures Used

Component	Data Structure Used	Description
Cart	Linked List	Dynamic cart operations per user
Undo Feature	Stack	Undo the last cart operation
User/Product DB	Arrays	Store all users/products in memory
Persistent Files	File I/O	Store user/product data to text files

6. Functionalities

Admin Functionalities:

- View All Products
- Add New Product
- Edit Existing Product
- Delete Product
- Sort/Search Products

Customer Functionalities:

- Register/Login
- View and Search Products
- Add Items to Cart
- View and Remove from Cart
- Undo Last Cart Action
- Checkout (Name, Address, Payment Method)

7. File Handling

- **users.txt**: Stores user credentials and roles
- **products.txt**: Stores product details (id, name, price, quantity)

Format Example:

products.txt:

```
0,Phone,15000,5
1,Laptop,70000,2
```

users.txt:

0,saif,password123,customer
1,admin,adminpass,admin

8. Code Structure

- **main()**: Entry point, loads data, invokes UI
- **user_interface**: Handles user interactions and main menus
- **product_catalog**: Manages product operations
- **Cart**: Manages customer cart using linked list
- **UndoStack**: Tracks cart states for undo functionality
- **File Functions**: Load and save users/products from/to text files

9. Testing and Validation

- Manual test cases for:
  - Login/Register edge cases
  - Product ID validation
  - Cart operations with invalid input
  - Undo feature with empty stack
- File read/write integrity checked using sample data files

10. Conclusion

This project effectively applies Data Structures and Algorithms (DSA) concepts in a real-world simulation. It demonstrates:

- Use of Linked Lists and Stacks
- Object-Oriented Design
- File-based data persistence
- Realistic and practical feature implementation

11. Credits

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You can get this from Github: *https://github.com/WhiteMonkey31/E-Commerce_Cart_-_Checkout_System.git*

Thank you for using our E-Commerce Store!

The End