

Semester Project:

**INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD**

## Data Structure & Algorithm (DS&A)

## Topic:-

## E-Commerce Cart & Checkout System

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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.

1. **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.

1. **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

1. **System Architecture**

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| Main Function |

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| Lock Screen UI |

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Admin UI Customer UI

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Product Ops Cart Ops, Search, Sort, Checkout

1. **Data Structures Used**

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| --- | --- | --- |
| **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 |

1. **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)

1. **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

1. **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

1. **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

1. **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

1. **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**