

DSA Lab Project Proposal

Project Title:

Inventory Track Pro: Smart Inventory Management System

Group Members:

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Project Description: This project implements a console-based Smart Inventory Management System that efficiently handles product operations using core Data Structures and Algorithms. The system combines multiple data structures to deliver fast product management, dynamic sorting, and persistent storage.

Key Features:

- Hash Table for $O(1)$ product operations (insert, delete, search)
- Arrays & Sorting Algorithms for multi-criteria sorting (price, rating, sales)
- Binary Search Tree for efficient range queries and organized data retrieval
- Stack for undo/redo functionality
- File I/O for data persistence across sessions

Core Functionalities:

- Add, remove, update, and search products
- Sort products by price, rating, or sales (ascending/descending)
- Display products within specific price ranges
- Undo/redo last operations
- Save/load inventory from files

Data Structures Used:

- Hash Table (Primary storage)
- Arrays (Sorting operations)
- Binary Search Tree (Range queries)
- Stack (Action history)
- File I/O (Data persistence)