Study Materials Management System

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MINI LAB PROJECT REPORT

This Report Presented in Partial Fulfillment of the course **CSE312: Database Management System Lab in the Computer Science and Engineering Department**

DAFFODIL INTERNATIONAL UNIVERSITY

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DECLARATION

We hereby declare that this lab project has been done by us under the supervision of **Md. Mahedi Hassan (MHS), Lecture**, Department of Computer Science and Engineering, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere as lab projects.

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COURSE & PROGRAM OUTCOME

The following course have course outcomes as following:.

Table 1: Course Outcome Statements

CO's	Statements
CO1	**Define** and **Relate** classes, objects, members of the class, and relationships among them needed for solving specific problems
CO2	**Formulate** knowledge of object-oriented programming and Java in problem solving
CO3	**Analyze** Unified Modeling Language (UML) models to **Present** a specific problem
CO4	**Develop** solutions for real-world complex problems **applying** OOP concepts while evaluating their effectiveness based on industry standards.

Table 2: Mapping of CO, PO, Blooms, KP and CEP

CO	PO	Blooms	KP	CEP
CO1	PO1	C1, C2	KP3	EP1, EP3
CO2	PO2	C2	KP3	EP1, EP3
CO3	PO3	C4, A1	KP3	EP1, EP2
CO4	PO3	C3, C6, A3, P3	KP4	EP1, EP3

The mapping justification of this table is provided in section **4.3.1**, **4.3.2** and **4.3.3**.

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Chapter 1

Introduction

This chapter outlines the motivation, objective, feasibility, and expected outcomes of the Study Materials Management System.

1.1 Introduction

In academic institutions, efficiently managing educational materials is a recurring challenge. This project aims to develop a web-based Study Materials Management System that streamlines the process of storing, updating, and ordering study materials.

1.2 Motivation

Manual tracking of study materials often leads to mismanagement and loss of data. Automating this system helps ensure better organization, easy accessibility, and data integrity. Moreover, building this system strengthens our web development skills in Python, Flask, MySQL, and Bootstrap.

1.3 Objectives

- To manage a database of study materials.
- To enable adding, updating, and deleting materials.
- To allow users to place and manage orders.
- To maintain availability status of materials.

1.4 Feasibility Study

Existing systems like bookstore inventories or online school material platforms offer similar functionalities. However, most are commercial solutions. This project is tailored to educational institutions needing a lightweight, custom solution.

1.5 Gap Analysis

While many systems offer generic inventory solutions, few are focused on educational material management in a simplified academic context. This project addresses that gap.

1.6 Project Outcome

A fully functional web application to manage study materials and related orders, with CRUD functionalities and a user-friendly interface.

Chapter 2

Proposed Methodology/Architecture

This chapter presents the analysis, design, UI mockups, and the project plan.

2.1 Requirement Analysis & Design Specification

2.1.1 Overview

The system has two main modules: material management and order management. Admins can add, update, delete materials and handle orders.

2.1.2 Proposed Methodology/ System Design

Technologies used:

- Backend: Python Flask
- Frontend: HTML, CSS, Bootstrap
- Database: MySQL

System Design Diagram:

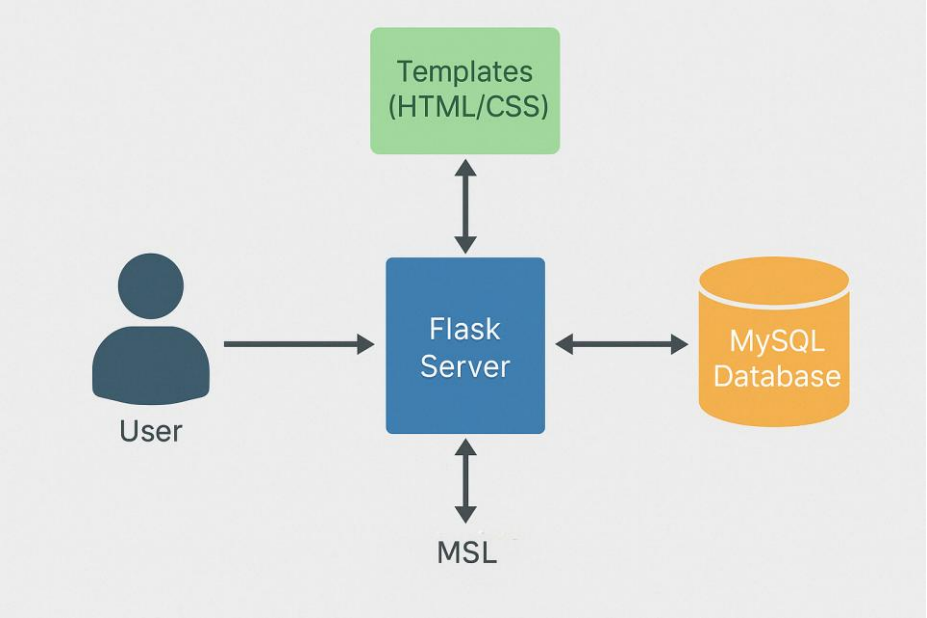


Figure 2.1: System architecture of the Study Materials Management System.

Database Diagram:

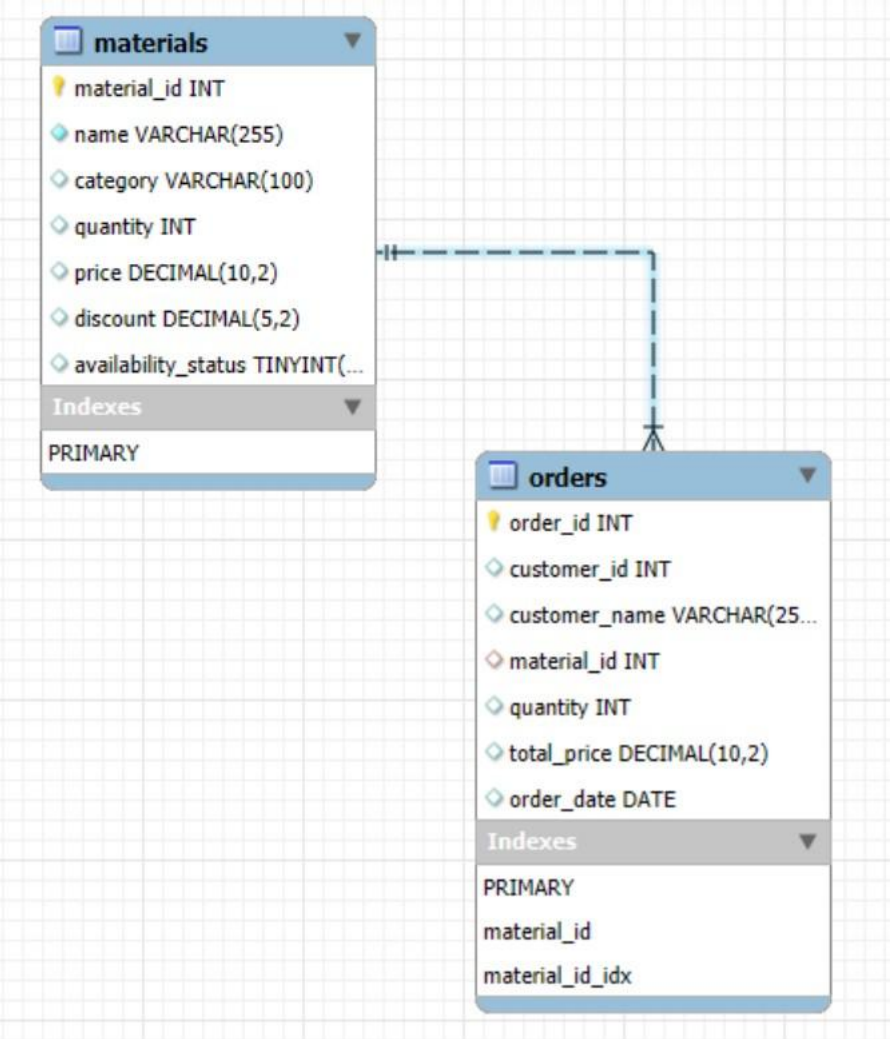
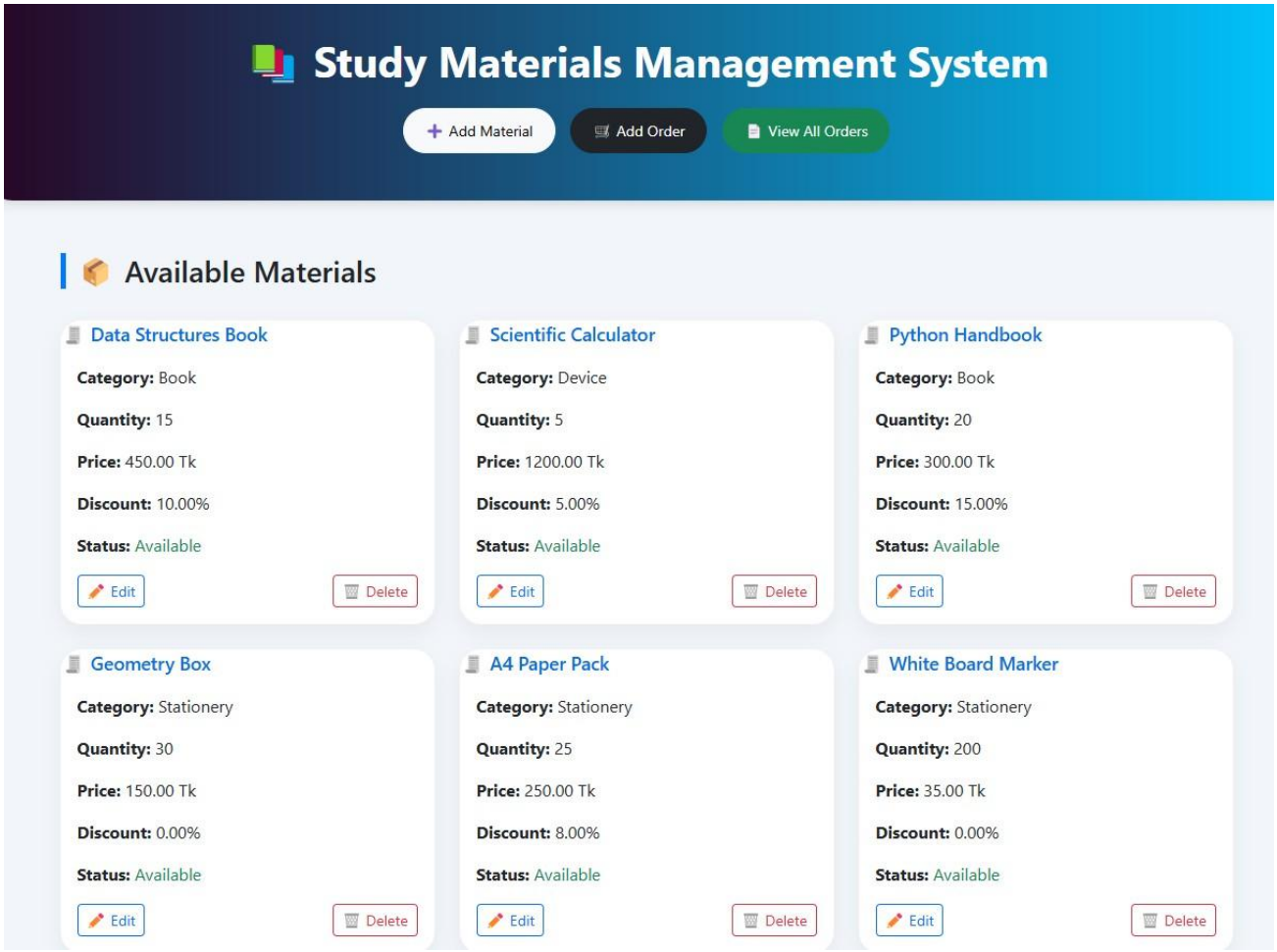


Figure 2.2: Database design of the Study Materials Management System.

2.1.3 UI Design



2.2 Overall Project Plan

- Week 1: Requirement gathering and planning
- Week 2: Backend and database design
- Week 3: Material management module
- Week 4: Order management module
- Week 5: UI enhancement and testing
- Week 6: Documentation and final report

Chapter 3

Implementation and Results

This chapter details the implementation of core features and evaluation of the system's performance.

3.1 Implementation

Key features:

- Add/Update/Delete study materials
- Place orders with quantity, price, discount
- Track availability
- Responsive UI with navigation and confirmation modals

3.2 Performance Analysis

The system responds efficiently for small to moderate datasets. Database operations are handled using SQLAlchemy for streamlined query building and performance. Page loads and database queries were optimized to ensure minimal latency. Validation and error handling were added to improve reliability.

3.3 Results and Discussion

The system successfully met all the project goals. All expected CRUD operations are functional, and orders are processed accurately. Users are able to manage materials and orders through a responsive and user-friendly interface. The modular structure of the system allows for easy maintenance and future expansion.

Chapter 4

Engineering Standards and Mapping

This chapter outlines how the project aligns with engineering standards, ethical considerations, sustainability, and program outcomes.

4.1 Impact on Society, Environment and Sustainability

4.1.1 Impact on Life

The application automates repetitive manual processes, increasing efficiency and reducing workload for academic staff.

4.1.2 Impact on Society & Environment

It promotes a digital, paperless system, reducing physical documentation and minimizing environmental impact.

4.1.3 Ethical Aspects

The system ensures ethical handling of information. No personal or sensitive data is collected. The open-source tech stack maintains transparency.

4.1.4 Sustainability Plan

The system is lightweight and modular, enabling future integration of more features such as analytics, authentication, and report generation without major redesign.

4.2 Project Management and Team Work

Agile development methodology was followed with iterative development and regular testing. The project was managed by dividing tasks into frontend, backend, and testing. As it relied on open-source technologies, the total cost remained negligible. Two budget models were evaluated—one with self-hosting and another with deployment on cloud platforms like Heroku.

4.3 Complex Engineering Problem

4.3.1 Mapping of Program Outcome

In this section, provide a mapping of the problem and provided solution with targeted Program Outcomes (PO's).

Table 4.1: Justification of Program Outcomes

PO's	Justification
PO1	Used engineering principles for design
PO2	Developed full-stack web-based solution
PO3	Integrated tools like Flask and MySQL
PO4	Ensured user-centric, sustainable design

4.3.2 Complex Problem Solving

In this section, provide a mapping with problem solving categories. For each mapping add subsections to put rationale (Use Table 4.2). For P1, you need to put another mapping with Chapter 4. Engineering Standards and Mapping 4.3. Complex Engineering Problem Knowledge profile and rational thereof.

Table 4.2: Mapping with complex problem solving.

EP1 Dept of Knowledge	**EP2** Range of Conflicting Requirements	**EP3** Depth of Analysis	**EP4** Familiarity of Issues	**EP5** Extent of Applicable Codes	**EP6** Extent Of Stakeholder Involvement	**EP7** Inter-dependence
Applied database design and UI development skills	Managed feature trade-offs for user simplicity	Deep analysis of CRUD operations and validation	Addressed user flow issues	Considered scalability and future features	Involved feedback from academic user	Integrated multiple components effectively

4.1.1 Engineering Activities

In this section, provide a mapping with engineering activities. For each mapping add subsections to put rationale (Use Table 4.3).

Table 4.3: Mapping with complex engineering activities.

EA1 Range of resources	**EA2** Level of Interaction	**EA3** Innovation	**EA4** Consequences for society and environment	**EA5** Familiarity
Used web frameworks and relational databases	Built dynamic pages with real-time data interaction	Reused design patterns for CRUD and modularity	Evaluated ethical, societal, and usability aspects	Based on familiar and sustainable technologies

Chapter 5

Conclusion

This chapter summarizes the work, mentions limitations, and proposes future improvements.

5.1 Summary

The project achieved its goals of creating a study material and order management platform with core functionality and user-friendly design.

5.2 Limitation

- User roles are not separated (no login/authentication)
- No export/report generation functionality

5.3 Future Work

- Add authentication for admin and users
- Include report generation and search functionality
- Enhance UI/UX with more interactivity

References

[1] Case studies and documentation of similar inventory management systems.
[2] Flask and MySQL integration official docs.
[3] Bootstrap documentation for UI component