1. Project Information

Course: CS 4347.003 - Database Systems - F25
Assignment: Milestone 2 – Library Management System
Team Members:

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This project implements all backend logic required for Milestone 2, including:

- Database creation (Milestone01)
- Data loading (Milestone01)
- Book search/availability (Functional requirement 2)
- Checkout/check-in (Functional requirement 3)
- Borrower management (Functional requirement 4)
- Fine calculation (Functional requirement 5)

2. Technologies Used

Language: Python 3.10+
Database: SQLite (built-in, no installation required)

Python Standard Libraries Used:

- **sqlite3** – database connections and SQL execution
- **datetime** – date calculations for loans and fines
- **csv** – reading and parsing CSV files for data loading
- **os** – file existence checks and path handling

3. Folder Structure

milestone2/

create_db.py	→ Creates SQLite database and all tables
load_data.py	→ Loads data from Excel/CSV files into tables
library_app.py	→ Implements all Milestone 2 functionality
authors.csv	→ Source data
book.csv	→ Source data
book_authors.csv	→ Source data
borrower.csv	→ Source data
library.db	→ Generated database
readme.pdf	→ This file

Notes:

- The **.venv/** folder was intentionally removed (virtual environments are system-specific).
- The macOS metadata folder **__MACOSX** was also removed from the ZIP as it is not required.

4. How to Run the Project

Step 1 — Create the Database

Run: **create_db.py**

This creates **library.db** and initializes the schema.

Step 2 — Load Initial Data

Run: **load_data.py**

This inserts all books, authors, book-author mappings, and borrower records from the provided Excel files.

Step 3 — Run Milestone 2 Functions

Run: **library_app.py**

This executes a full test sequence demonstrating:

- Book search (ISBN/title/author, case-insensitive, substring)
- Checkout logic (max 3 books, unpaid fines, availability)
- Check-in logic
- Borrower creation (unique SSN, auto-generated card IDs)
- Fine calculation for late books (returned or still-out)
- Fine payment logic (no partial payments, must return overdue books first)

The printed output shows each feature working with provided data.