#### **Library Management System (SQL Project)**

# **Objective**

The goal of this project is to design and analyze a **Library Management Database System** using SQL. This project simulates real-world library operations and answers key **business questions** such as:

- Tracking overdue books and calculating fines.
- Identifying high-performing employees.
- Measuring branch-level performance (books issued, returned, and revenue).
- Understanding customer/member behavior and book rental trends.

### **★** Tools & Technologies Used

• Database: PostgreSQL

• Interface: pgAdmin 4

#### SQL Concepts Applied:

- CRUD Operations (INSERT, UPDATE, DELETE, SELECT)
- Joins (INNER JOIN, LEFT JOIN)
- Aggregations (SUM, COUNT, AVG, GROUP BY, HAVING)
- Date & Interval Functions (CURRENT\_DATE, INTERVAL, overdue calculations)
- Ranking & Ordering (LIMIT, ORDER BY)

### • Visualization & Documentation:

- ERD Design: dbdiagram.io / Draw.io
- GitHub (for project hosting)
- LinkedIn (for professional sharing)

## Dataset & Tables

The project is built on a **sample library database** with the following tables:

- **books** Book details (ISBN, title, category, rental price, availability).
- members Library members (ID, name, address, registration date).
- **employees** Staff managing book issues/returns.
- **branch** Library branches and their managers.

- issued\_status Book issue records (who issued, when, by which employee).
- return\_status Book return records (return date, fines, etc.).

# Project Tasks

### 1 CRUD Operations

- ✓ Insert new book records
- ✓ Update member details
- ✓ Delete issue records
- ✓ Retrieve books issued by a specific employee
- ✓ List members with more than one issued book

## 2 Data Analysis & Business Queries

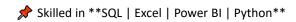
- Retrieve all books in a specific category
- Calculate total rental income by category
- List members who registered in the last 180 days
- Show employees with their branch manager's name and details
- Retrieve list of books not yet returned

### 3 Advanced Analysis

- Overdue Books → Identify overdue members & calculate fines (\$0.50/day).
- **Branch Performance Report** → Books issued, returned, and revenue generated per branch.
- **Top Employees** → Employees who processed the most book issues.

### **Key Insights**

- Some members have multiple overdue books, leading to significant fines.
- Branches with higher employee activity show higher revenues.
- ♦ Certain categories (e.g., *Science Fiction, Classics*) generate the most rentals.
- ◆ Top 3 employees process the majority of book issues, indicating workload concentration.
- Author: \*\*Sagar Hiware\*\*
- Aspiring Data Analyst



<u>LinkedIn</u>

Github