

## **City Library Management System Project**

**Name** - Chiranjit Dey

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### **Project summary**

Built a clean MySQL database for a public library with tables for authors, books, copies, members, loans, fines, events, registrations, and an audit log.

Kept things practical with primary and foreign keys, enums for statuses, and a strict parent-first, child-later loading order.

### **Goals completed**

- Goal 1–2: Designed the schema and loaded realistic seed data that covers everyday cases like overdue loans and mixed membership statuses.
- Goal 3–4: Wrote basic filters and aggregations to answer day-to-day questions quickly.
- Goal 5–6: Used joins, subqueries, and CTEs to turn multi-table questions into clear steps.
- Goal 7–8: Combined datasets with UNION and used window functions for rankings, trends, and running totals.

### **What I learned**

I turned business rules into tables, keys, and constraints that actually prevent bad data.

I learned to write queries that start simple and scale to multi-step analyses without getting messy.

## **Challenges and fixes**

Foreign key errors pushed me to respect dependencies and align data types before inserts.

Data realism mattered, so I mixed dates, statuses, and genres to avoid “happy-path only” queries.

INNER vs LEFT joins and window partitions needed careful ordering and quick test queries to confirm logic.

## **Overall**

By Goal 8, I had a dependable schema, believable data, and queries that move from quick lookups to ranked insights with confidence.