Library Loan Management with SQL

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Hi, I'm Sheva.

I'm a third-year Computer Science student at Universitas Pertamina with a passion for data analysis and machine learning. Through this post, I'm sharing my first SQL project, a simple exercise in exploring insights directly from raw data using queries. I hope this can be the beginning of more opportunities to learn, collaborate, and grow in the data field.

Project Summary

- Built 3-table database: members, books, loans
- 50 dummy records/table via Python Faker
- Analyzed with SQL in phpMyAdmin
- Tools: phpMyAdmin,
- SQL: JOIN, GROUP BY, DATEDIFF, COUNT

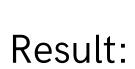| Table Name	Description
members	Id_members, nama, email, alamat, tgl_daftar
books	Id_books, judul, penulis, kategori, tahun_terbit
loans	Id_loan, id_member, id_book, tgl_pinjam, tgl_kembali, status

Storytelling with SQL

1. Who is currently borrowing books?

Query:

```sql
SELECT m.nama, b.judul, l.tgl_pinjam
FROM loans l
JOIN members m ON l.id_member = m.id_member
JOIN books b ON l.id_book = b.id_book
WHERE l.status = 'Dipinjam';
```

Insight:

Several members still have active loans, with books borrowed as far back as September 2024. This may indicate either long loan periods or overdue returns. Active monitoring is essential to ensure timely returns and circulation.

Result:

nama	judul	tgl_pinjam
Oni Purwanti	Ullam odio.	2025-06-13
Kamila Nababan	Saepe dolorum incidunt.	2025-03-15
Maras Uwais	Explicabo.	2025-02-07
Diah Simbolon	Labore delectus et.	2025-06-22
Danuja Zulkarnain, S.IP	Corporis mollitia quisquam excepturi.	2025-01-31
R.A. Zelda Narpati, S.Sos	Inventore minima.	2025-02-07
R.M. Kunthara Suartini	Ipsa expedita.	2025-04-03
Abyasa Anggraini, M.TI.	Maxime a.	2025-04-26
Drs. Akarsana Rajasa, S.E.	Occaecati architecto dicta.	2024-09-17
Mariadi Firgantoro	Inventore minima.	2024-11-05
Ana Lailasari	Sapiente ducimus.	2024-10-30

Storytelling with SQL

2. What are the most borrowed books?

Query:

```sql
SELECT b.judul, COUNT(*) AS jumlah_dipinjam
FROM loans l
JOIN books b ON l.id_book = b.id_book
GROUP BY b.judul
ORDER BY jumlah_dipinjam DESC
LIMIT 5;
```

Result:

judul	jumlah_dipinjam ▼ 1
Ipsa expedita.	5
Inventore minima.	3
Asperiores rem.	3
Explicabo repudiandae cupiditate.	2
Vitae recusandae molestias.	2

Insight:

"Ipse Expedita" is the most borrowed book, followed by "Inventore Minima". This indicates strong user interest and suggests that more copies of these titles may be needed to meet demand.

Storytelling with SQL

3. When do people borrow the most?

Query:

```sql
SELECT DATE_FORMAT(tgl_pinjam, '%Y-%m') AS bulan, COUNT(*) AS jumlah_pinjam
FROM loans
GROUP BY bulan
ORDER BY bulan;
```

Result:

bulan ▲ 1	jumlah_pinjam
2024-08	4
2024-09	3
2024-10	7
2024-11	3
2024-12	3
2025-01	5
2025-02	6
2025-03	4
2025-04	6
2025-05	5
2025-06	3
2025-07	1

Insight:

October 2024 saw the highest borrowing activity, followed by February and April 2025. This may reflect seasonal demand such as semester starts or exam periods, providing insight for future book stocking and promotion strategies.

Storytelling with SQL

4. Which books were never borrowed?

Query:

```sql
SELECT b.judul
FROM books b
LEFT JOIN loans l ON b.id_book = l.id_book
WHERE l.id_book IS NULL;
```

Insight:

At least 15 books have never been borrowed, indicating low interest or visibility. These titles may require repositioning, promotion, or potential removal from the active catalog to optimize shelf space and inventory cost.

Result:

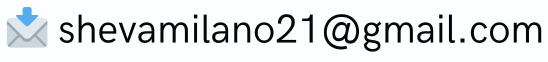| judul |
| --- |
| Nisi saepe eveniet. |
| Minima quae debitis. |
| Iste doloribus nobis. |
| Eligendi sequi. |
| Sunt fuga voluptate at. |
| Temporibus ratione. |
| Facilis distinctio quis. |
| Quaerat. |

Key Insight Summary

SQL queries executed via phpMyAdmin revealed important insights from the library's loan database. The project began by building a clear relational structure with tables for members, books, and loans. From this foundation, various questions were answered such as who is currently borrowing books, which titles are the most or least popular, and when borrowing activity is highest. The analysis showed clear trends in user behavior and book circulation, including several unused books and a small number of members who dominate total borrowing. These findings not only helped uncover patterns, but also highlighted opportunities to improve inventory, encourage fairer access to books, and support better management decisions in the library system.

That's all from me!

If you spot any mistakes, feel free to let me know.

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