Library Management System .

ABOUT THIS PROJECT

THIS PROJECT DEMONSTRATES THE IMPLEMENTATION OF A LIBRARY MANAGEMENT SYSTEM USING SQL. IT INCLUDES CREATING AND MANAGING TABLES, PERFORMING CRUD OPERATIONS, AND EXECUTING ADVANCED SQL QUERIES. THE GOAL IS TO SHOWCASE SKILLS IN DATABASE DESIGN, MANIPULATION, AND QUERYING. .

OBJECTIVE OF THIS PROJECT

- Design and implement an SQL-based Library Management System.
- Manage books, members, and transactions efficiently.
- Perform CRUD operations for database management.
- Use CTAS for analytical table creation.
- Execute advanced SQL queries for reporting and insights.
- Simulate real-world library operations using relational database concepts.

TASK 1

```
3
4   -- Task 1. Create a New Book Record
5    -- "978-1-60129-456-2', 'To Kill a Mockingbird', 'Classic', 6.00, 'yes', 'Harper Lee', 'J.B. Lippincott & Co.')"
6
7 • INSERT INTO books(isbn, book_title, category, rental_price, status, author, publisher)
8   VALUES
9   ('978-1-60129-456-2', 'To Kill a Mockingbird', 'Classic', 6.00, 'yes', 'Harper Lee', 'J.B. Lippincott & Co.');
10 • SELECT * FROM books;
11
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

isbn	book_title	category	rental_price	status	author	publisher
978-0-679-76489-8	Harry Potter and the Sorc...	Fantasy	7.00	yes	J.K. Rowling	Scholastic
978-0-679-77644-3	Beloved	Fiction	6.50	yes	Toni Morrison	Knopf
978-0-7432-4722-4	The Da Vinci Code	Mystery	8.00	yes	Dan Brown	Doubleday
978-0-7432-4722-5	Angels & Demons	Mystery	7.50	yes	Dan Brown	Doubleday
978-0-7432-7356-4	The Hobbit	Fantasy	7.00	yes	J.R.R. Tolkien	Houghton Mifflin ...
978-0-7432-7357-1	1491: New Revelations of ...	History	6.50	no	Charles C. Mann	Vintage Books
978-0-7434-7679-3	The Stand	Horror	7.00	yes	Stephen King	Doubleday
978-1-60129-456-2	To Kill a Mockingbird	Classic	6.00	yes	Harper Lee	J.B. Lippincott & ...
NULL	NULL	NULL	NULL	NULL	NULL	NULL

TASK 2

```
12
13   -- Task 2: Update an Existing Member's Address
14
15 • UPDATE members
16   SET member_address = '125 Main St'
17   WHERE member_id = 'C101';
18 • SELECT * FROM members;
19
20
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

member_id	member_name	member_address	reg_date
C101	Alice Johnson	125 Main St	2021-05-15
C102	Bob Smith	456 Elm St	2021-06-20
C103	Carol Davis	789 Oak St	2021-07-10
C104	Dave Wilson	567 Pine St	2021-08-05
C105	Eve Brown	890 Maple St	2021-09-25
C106	Frank Thomas	234 Cedar St	2021-10-15
C107	Grace Taylor	345 Walnut St	2021-11-20
C108	Henry Anderson	456 Birch St	2021-12-10
C109	Ivy Martinez	567 Oak St	2022-01-05

members 14

TASK 3

```
20
21  -- Task 3: Delete a Record from the Issued Status Table
22  -- Objective: Delete the record with issued_id = 'IS121' from the issued_status table.
23
24
25  DELETE FROM issued_status
26  WHERE issued_id = 'IS121'
27
28  SELECT * FROM issued_status;
29
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

issued_id	issued_member_id	issued_book_name	issued_date	issued_book_isbn	issued_emp_id
IS118	C101	Pride and Prejudice	2024-03-22	978-0-14-143951-8	E108
IS119	C110	Brave New World	2024-03-23	978-0-452-28240-7	E108
IS120	C110	The Road	2024-03-24	978-0-670-81302-4	E108
IS122	C102	Fahrenheit 451	2024-03-26	978-0-451-52993-5	E109
IS123	C103	Dune	2024-03-27	978-0-345-39180-3	E109
IS124	C104	Where the Wild Things Are	2024-03-28	978-0-06-025492-6	E110
IS125	C105	The Kite Runner	2024-03-29	978-0-06-112241-5	E110
IS126	C105	Charlotte's Web	2024-03-30	978-0-06-440055-8	E110
IS127	C105	Beloved	2024-03-31	978-0-679-77644-3	E110

issued_status 15

TASK 4

```sql
-- Task 4: Retrieve All Books Issued by a Specific Employee
 -- Objective: Select all books issued by the employee with emp_id = 'E101'.

SELECT * FROM issued_status
WHERE issued_emp_id = 'E101';
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

issued_id	issued_member_id	issued_book_name	issued_date	issued_book_isbn	issued_emp_id
IS130	C106	Moby Dick	2024-04-03	978-0-451-52994-2	E101
IS131	C106	To Kill a Mockingbird	2024-04-04	978-0-06-112008-4	E101
IS154	C105	The Road	2025-10-21	978-0-375-50167-0	E101
NULL	NULL	NULL	NULL	NULL	NULL

TASK 5

```sql
-- Task 5: List Members Who Have Issued More Than One Book
-- Objective: Use GROUP BY to find members who have issued more than one book.

SELECT
    ist.issued_emp_id,
     e.emp_name
    -- COUNT(*)
FROM issued_status as ist
JOIN
employees as e
ON e.emp_id = ist.issued_emp_id
GROUP BY 1, 2
HAVING COUNT(ist.issued_id) > 1

```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

issued_emp_id	emp_name
E101	John Doe
E102	Jane Smith
E104	Emily Davis
E105	Sarah Brown
E106	Michelle Ramirez
E107	Michael Thompson
E108	Jessica Taylor
E109	Daniel Anderson
E110	Laura Martinez

TASK 6

```sql
-- CTAS
-- Task 6: Create Summary Tables: Used CTAS to generate new tables based on query results -
-- each book and total book_issued_cnt**
CREATE TABLE book_cnts
AS
SELECT
    b.isbn,
    b.book_title,
    COUNT(ist.issued_id) as no_issued
FROM books as b
JOIN
issued_status as ist
ON ist.issued_book_isbn = b.isbn
GROUP BY 1, 2;
SELECT * FROM book_cnts;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

isbn	book_title	no_issued
978-0-06-025492-6	Where the Wild Things Are	1
978-0-06-112008-4	To Kill a Mockingbird	1
978-0-06-112241-5	The Kite Runner	1
978-0-06-440055-8	Charlotte's Web	1
978-0-09-957807-9	A Game of Thrones	1
978-0-14-027526-3	A Tale of Two Cities	1
978-0-14-044930-3	The Histories	1
978-0-14-118776-1	One Hundred Years of Sol...	1
978-0-14-143951-8	Pride and Prejudice	2

TASK 7

```
69
70   -- Task 7. Retrieve All Books in a Specific Category:
71
72 • SELECT * FROM books
73   WHERE category = 'Classic'
74
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

isbn	book_title	category	rental_price	status	author	publisher
978-0-06-112008-4	To Kill a Mockingbird	Classic	5.00	yes	Harper Lee	J.B. Lippincott & Co.
978-0-14-027526-3	A Tale of Two Cities	Classic	4.50	yes	Charles Dickens	Penguin Books
978-0-14-143951-8	Pride and Prejudice	Classic	5.00	yes	Jane Austen	Penguin Classics
978-0-141-44171-6	Jane Eyre	Classic	4.00	yes	Charlotte Bronte	Penguin Classics
978-0-330-25864-8	Animal Farm	Classic	5.50	yes	George Orwell	Penguin Books
978-0-451-52994-2	Moby Dick	Classic	6.50	no	Herman Melville	Penguin Books
978-0-525-47535-5	The Great Gatsby	Classic	8.00	yes	F. Scott Fitzgerald	Scribner
978-0-553-29698-2	The Catcher in the Rye	Classic	7.00	yes	J.D. Salinger	Little, Brown and Company
978-1-60129-456-2	To Kill a Mockingbird	Classic	6.00	yes	Harper Lee	J.B. Lippincott & Co.
NULL	NULL	NULL	NULL	NULL	NULL	NULL

TASK 8

```sql
-- Task 8: Find Total Rental Income by Category:
SELECT
    b.category,
    SUM(b.rental_price),
    COUNT(*)
FROM books as b
JOIN
issued_status as ist
ON ist.issued_book_isbn = b.isbn
GROUP BY 1
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

category	SUM(b.rental_price)	COUNT(*)
Children	7.50	2
Classic	78.00	13
Fiction	14.50	3
Fantasy	28.50	4
History	49.50	7
Literary Fiction	6.50	1
Science Fiction	8.50	1
Dystopian	32.50	5
Mystery	7.50	1
Horror	7.00	1

TASK 9

```
88  -- task 9-- List Members Who Registered in the Last 180 Days:
89
90  SELECT *
91  FROM members;
92  WHERE reg_date >= CURRENT_DATE - INTERVAL 180 DAY;
93
94
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

member_id	member_name	member_address	reg_date
C101	Alice Johnson	125 Main St	2021-05-15
C102	Bob Smith	456 Elm St	2021-06-20
C103	Carol Davis	789 Oak St	2021-07-10
C104	Dave Wilson	567 Pine St	2021-08-05
C105	Eve Brown	890 Maple St	2021-09-25
C106	Frank Thomas	234 Cedar St	2021-10-15
C107	Grace Taylor	345 Walnut St	2021-11-20
C108	Henry Anderson	456 Birch St	2021-12-10
C109	Ivy Martinez	567 Oak St	2022-01-05
C110	Jack Wilson	678 Pine St	2022-02-25
C118	Sam	133 Pine St	2024-06-01
C119	John	143 Main St	2024-05-01
NULL	NULL	NULL	NULL

TASK 10

```
95   -- task 10 List Employees with Their Branch Manager's Name and their branch details:
96 • SELECT
97       e1.*,
98       b.manager_id,
99       e2.emp_name as manager
100  FROM employees as e1
101  JOIN
102  branch as b
103  ON b.branch_id = e1.branch_id
104  JOIN
105  employees as e2
106  ON b.manager_id = e2.emp_id
107
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

emp_id	emp_name	position	salary	branch_id	manager_id	manager
E101	John Doe	Clerk	60000.00	B001	E109	Daniel Anderson
E103	Mike Johnson	Librarian	55000.00	B001	E109	Daniel Anderson
E104	Emily Davis	Assistant	40000.00	B001	E109	Daniel Anderson
E105	Sarah Brown	Assistant	42000.00	B001	E109	Daniel Anderson
E106	Michelle Ramirez	Assistant	43000.00	B001	E109	Daniel Anderson
E102	Jane Smith	Clerk	45000.00	B002	E109	Daniel Anderson
E109	Daniel Anderson	Manager	57000.00	B003	E109	Daniel Anderson
E108	Jessica Taylor	Clerk	46000.00	B004	E110	Laura Martinez
E107	Michael Thompson	Clerk	62000.00	B005	E110	Laura Martinez
E110	Laura Martinez	Manager	41000.00	B005	E110	Laura Martinez

Result 24

TASK 11

```
109   -- Task 11. Create a Table of Books with Rental Price Above a Certain Threshold 7USD:
110
111   CREATE TABLE books_price_greater_than_seven
112   AS
113   SELECT * FROM Books
114   WHERE rental_price > 7
115
116   SELECT * FROM
117   books_price_greater_than_seven
118
119
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

isbn	book_title	category	rental_price	status	author	publisher
978-0-09-957807-9	A Game of Thrones	Fantasy	7.50	yes	George R.R. Martin	Bantam
978-0-307-58837-1	Sapiens: A Brief History of...	History	8.00	no	Yuval Noah Harari	Harper Perennial
978-0-345-39180-3	Dune	Science Fiction	8.50	yes	Frank Herbert	Ace
978-0-393-05081-8	A Peoples History of the U...	History	9.00	yes	Howard Zinn	Harper Perennial
978-0-525-47535-5	The Great Gatsby	Classic	8.00	yes	F. Scott Fitzgerald	Scribner
978-0-7432-4722-4	The Da Vinci Code	Mystery	8.00	yes	Dan Brown	Doubleday
978-0-7432-4722-5	Angels & Demons	Mystery	7.50	yes	Dan Brown	Doubleday

TASK 12

```sql
-- Task 12: Retrieve the List of Books Not Yet Returned

SELECT
    DISTINCT ist.issued_book_name
FROM issued_status as ist
LEFT JOIN
return_status as rs
ON ist.issued_id = rs.issued_id
WHERE rs.return_id IS NULL
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

issued_book_name
Fahrenheit 451
Dune
Where the Wild Things Are
The Kite Runner
Charlotte's Web
Beloved
A Tale of Two Cities
The Stand
To Kill a Mockingbird
The Hobbit
Angels & Demons
The Diary of a Young Girl
Sapiens: A Brief History o...

TASK 13

```
/*
Task 13:
Identify Members with Overdue Books
Write a query to identify members who have overdue books (assume a 30-day return period).
Display the member's_id, member's name, book title, issue date, and days overdue.
*/

SELECT
    ist.issued_member_id,
    m.member_name,
    bk.book_title,
    ist.issued_date,
    -- rs.return_date,
    CURRENT_DATE - ist.issued_date as over_dues_days
FROM issued_status as ist
JOIN
members as m
    ON m.member_id = ist.issued_member_id
JOIN
books as bk
ON bk.isbn = ist.issued_book_isbn
LEFT JOIN
return_status as rs
ON rs.issued_id = ist.issued_id
WHERE
    rs.return_date IS NULL
    AND
    (CURRENT_DATE - ist.issued_date) > 30
ORDER BY 1;
```

issued_member_id	member_name	book_title	issued_date	over_dues_days
C102	Bob Smith	Fahrenheit 451	2024-03-26	10796
C103	Carol Davis	Dune	2024-03-27	10795
C104	Dave Wilson	Where the Wild Things Are	2024-03-28	10794
C105	Eve Brown	The Kite Runner	2024-03-29	10793
C105	Eve Brown	Charlotte's Web	2024-03-30	10792
C105	Eve Brown	Beloved	2024-03-31	10791
C105	Eve Brown	A Tale of Two Cities	2024-04-01	10721
C105	Eve Brown	The Stand	2024-04-02	10720
C105	Eve Brown	The Road	2025-10-21	101
C106	Frank Thomas	To Kill a Mockingbird	2024-04-04	10718
C106	Frank Thomas	The Hobbit	2024-04-05	10717
C107	Grace Taylor	Angels & Demons	2024-04-06	10716
C107	Grace Taylor	The Diary of a Young Girl	2024-04-07	10715
C107	Grace Taylor	Sapiens: A Brief History o...	2024-04-08	10714
C107	Grace Taylor	1491: New Revelations of...	2024-04-09	10713
C107	Grace Taylor	The Catcher in the Rye	2024-04-10	10712
C108	Henry Anderson	The Great Gatsby	2024-04-11	10711
C109	Ivy Martinez	Harry Potter and the Sorc...	2024-04-12	10710
C110	Jack Wilson	Animal Farm	2024-04-13	10709

TASK 14

```
/*
Task 14: Branch Performance Report
Create a query that generates a performance report for each branch, showing the number of books issued, the number of books returned,
and the total revenue generated from book rentals.
*/
CREATE TABLE branch_reports
AS
SELECT
    b.branch_id,
    b.manager_id,
    COUNT(ist.issued_id) as number_book_issued,
    COUNT(rs.return_id) as number_of_book_return,
    SUM(bk.rental_price) as total_revenue
FROM issued_status as ist
JOIN employees as e
ON e.emp_id = ist.issued_emp_id
JOINbranch as b
ON e.branch_id = b.branch_id
LEFT JOINreturn_status as rs
ON rs.issued_id = ist.issued_id
JOIN books as bk
ON ist.issued_book_isbn = bk.isbn
GROUP BY 1, 2;

SELECT * FROM branch_reports;

SELECT * FROM branch_reports;


-- Task 15: CTAS: Create a Table of Active Members
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

branch_id	manager_id	number_book_issued	number_of_book_return	total_revenue
B001	E109	18	10	118.50
B005	E110	10	3	55.00
B004	E110	5	3	33.50
B003	E109	3	0	21.00
B002	E109	2	0	12.00

TASK 15

```sql
-- Task 15: CTAS: Create a Table of Active Members
-- Use the CREATE TABLE AS (CTAS) statement to create a new table active_members containing members who have issued at least one book in the last 2 months.

CREATE TABLE active_members AS
SELECT *
FROM members
WHERE member_id IN (
    SELECT DISTINCT issued_member_id
    FROM issued_status
    WHERE issued_date >= CURRENT_DATE - INTERVAL 2 MONTH
);

SELECT * FROM active_members;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

member_id	member_name	member_address	reg_date
C105	Eve Brown	890 Maple St	2021-09-25
C106	Frank Thomas	234 Cedar St	2021-10-15
C118	Sam	133 Pine St	2024-06-01
C119	John	143 Main St	2024-05-01

TASK 16

```sql
--
-- Task 16: Find Employees with the Most Book Issues Processed
-- Write a query to find the top 3 employees who have processed the most book issues. Display the employee name, number of books processed, and their branch.

SELECT
    e.emp_name,
    b.*,
    COUNT(ist.issued_id) as no_book_issued
FROM issued_status as ist
JOIN
employees as e
ON e.emp_id = ist.issued_emp_id
JOIN
branch as b
ON e.branch_id = b.branch_id
GROUP BY 1, 2;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

emp_name	branch_id	manager_id	branch_address	contact_no	no_book_issued
John Doe	B001	E109	123 Main St	+919099988676	3
Mike Johnson	B001	E109	123 Main St	+919099988676	1
Emily Davis	B001	E109	123 Main St	+919099988676	4
Sarah Brown	B001	E109	123 Main St	+919099988676	4
Michelle Ramirez	B001	E109	123 Main St	+919099988676	6
Jane Smith	B002	E109	456 Elm St	+919099988677	2
Daniel Anderson	B003	E109	789 Oak St	+919099988678	3
Jessica Taylor	B004	E110	567 Pine St	+919099988679	5
Michael Thompson	B005	E110	890 Maple St	+919099988680	4
Laura Martinez	B005	E110	890 Maple St	+919099988680	6

LET’S CONNECT :

www.linkedin.com/in/waniumer-analytics