Task 5: SQL Joins in Library Management System

Objective: Learn to combine data from multiple tables

Tools: DB Browser for SQLite / MySQL Workbench

Outcome: Mastery of merging data

# 1. Table Creation (Library Management Example)

-- Table: Members  
CREATE TABLE Members (  
 MemberID INT PRIMARY KEY,  
 MemberName VARCHAR(100),  
 Email VARCHAR(100)  
);  
  
-- Table: BorrowedBooks  
CREATE TABLE BorrowedBooks (  
 BorrowID INT PRIMARY KEY,  
 BookTitle VARCHAR(150),  
 BorrowDate DATE,  
 MemberID INT,  
 FOREIGN KEY (MemberID) REFERENCES Members(MemberID)  
);

# 2. Sample Data Insertion

-- Insert Members  
INSERT INTO Members VALUES  
(1, 'Alice Smith', 'alice@example.com'),  
(2, 'Bob Johnson', 'bob@example.com'),  
(3, 'Charlie Rose', 'charlie@example.com');  
  
-- Insert BorrowedBooks  
INSERT INTO BorrowedBooks VALUES  
(201, 'SQL Essentials', '2024-06-01', 1),  
(202, 'Database Design', '2024-06-02', 1),  
(203, 'Learning Python', '2024-06-05', 2),  
(204, 'HTML & CSS', '2024-06-10', 4); -- MemberID 4 does not exist

## INNER JOIN

SELECT Members.MemberName, BorrowedBooks.BookTitle, BorrowedBooks.BorrowDate  
FROM Members  
INNER JOIN BorrowedBooks ON Members.MemberID = BorrowedBooks.MemberID;

✅ Output:

|  |  |  |
| --- | --- | --- |
| MemberName | BookTitle | BorrowDate |
| Alice Smith | SQL Essentials | 2024-06-01 |
| Alice Smith | Database Design | 2024-06-02 |
| Bob Johnson | Learning Python | 2024-06-05 |

## LEFT JOIN

SELECT Members.MemberName, BorrowedBooks.BookTitle, BorrowedBooks.BorrowDate  
FROM Members  
LEFT JOIN BorrowedBooks ON Members.MemberID = BorrowedBooks.MemberID;

✅ Output:

|  |  |  |
| --- | --- | --- |
| MemberName | BookTitle | BorrowDate |
| Alice Smith | SQL Essentials | 2024-06-01 |
| Alice Smith | Database Design | 2024-06-02 |
| Bob Johnson | Learning Python | 2024-06-05 |
| Charlie Rose | NULL | NULL |

## RIGHT JOIN

SELECT Members.MemberName, BorrowedBooks.BookTitle, BorrowedBooks.BorrowDate  
FROM Members  
RIGHT JOIN BorrowedBooks ON Members.MemberID = BorrowedBooks.MemberID;

✅ Output:

|  |  |  |
| --- | --- | --- |
| MemberName | BookTitle | BorrowDate |
| Alice Smith | SQL Essentials | 2024-06-01 |
| Alice Smith | Database Design | 2024-06-02 |
| Bob Johnson | Learning Python | 2024-06-05 |
| NULL | HTML & CSS | 2024-06-10 |

## FULL OUTER JOIN

SELECT Members.MemberName, BorrowedBooks.BookTitle, BorrowedBooks.BorrowDate  
FROM Members  
LEFT JOIN BorrowedBooks ON Members.MemberID = BorrowedBooks.MemberID  
  
UNION  
  
SELECT Members.MemberName, BorrowedBooks.BookTitle, BorrowedBooks.BorrowDate  
FROM Members  
RIGHT JOIN BorrowedBooks ON Members.MemberID = BorrowedBooks.MemberID;

✅ Output:

|  |  |  |
| --- | --- | --- |
| MemberName | BookTitle | BorrowDate |
| Alice Smith | SQL Essentials | 2024-06-01 |
| Alice Smith | Database Design | 2024-06-02 |
| Bob Johnson | Learning Python | 2024-06-05 |
| Charlie Rose | NULL | NULL |
| NULL | HTML & CSS | 2024-06-10 |