

SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE		DEPARTMENT OF COMPUTER SCIENCE ENGINEERING				
Program Name:	B. Tech	Assignment Type:	Lab			
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Course Code	24CS002PC 215	Course Title	AI Assisted Coding			
Year/Sem	II/I	Regulation	R24			
Date and Day of Assignment	Week 8 - Wednesday	Time(s)				
Duration	2 Hours	Applicable to Batches				
Assignment Number: 16.3 (Present assignment number) / 24 (Total number of assignments)						

	Question	Expected Time to complete
1	Lab 16 – Database Design and Queries: Schema Design and SQL Generation	Week 5 - Monday
	Lab Objectives	

- To practice basic SQL query generation with AI assistance.
- To analyze AI-suggested queries for correctness and efficiency.
- To understand how AI can help in documenting and improving database logic.

Learning Outcomes

After completing this lab, students will be able to:

1. Use AI tools to design a simple ER diagram / schema for a given scenario.
2. Generate CREATE TABLE statements using AI.
3. Write and refine basic SQL queries (SELECT, INSERT, UPDATE, DELETE).
4. Validate correctness and efficiency of AI-generated SQL.
5. Compare AI-generated vs manually written queries.

Task Description #1 – Schema Generation

Task: Ask AI to design a schema for a Library Management System (Tables: Books, Members, Loans).

SQL Code

```
CREATE TABLE Members (
    member_id INT PRIMARY KEY,
    name VARCHAR(100),
    email VARCHAR(100) UNIQUE,
    join_date DATE
);

CREATE TABLE Books (
    book_id INT PRIMARY KEY,
    title VARCHAR(200),
    author VARCHAR(100),
    available BOOLEAN
);

CREATE TABLE Loans (
    loan_id INT PRIMARY KEY,
    member_id INT,
    book_id INT,
    loan_date DATE,
    return_date DATE,
    FOREIGN KEY (member_id) REFERENCES Members(member_id),
    FOREIGN KEY (book_id) REFERENCES Books(book_id)
);
```

OUTPUT:

```
CREATE TABLE Members (
    member_id INT PRIMARY KEY,
    name VARCHAR(100),
    email VARCHAR(100) UNIQUE,
    join_date DATE
);

CREATE TABLE Books (
    book_id INT PRIMARY KEY,
    title VARCHAR(200),
    author VARCHAR(100),
    available BOOLEAN
);

CREATE TABLE Loans (
    loan_id INT PRIMARY KEY,
    member_id INT,
    book_id INT,
    loan_date DATE,
    return_date DATE,
    FOREIGN KEY (member_id) REFERENCES Members(member_id),
    FOREIGN KEY (book_id) REFERENCES Books(book_id)
);

File "/tmp/ipython-input-2452795888.py", line 1
    CREATE TABLE Members (
    ^
SyntaxError: invalid syntax
```

OBSERVATION:

The schema defines three tables: `Members` (stores member info with unique IDs), `Books` (stores book info with unique IDs and availability), and `Loans` (records who borrowed which book and when, linking members and books via foreign keys).

Task Description #2 – Error Insert Data

Task: Ask AI to generate `INSERT INTO` queries for the schema above (3 sample records per table).

OUTPUT:

```

# Insert sample data into Members table
cursor.execute('''
INSERT INTO Members (member_id, name, email, join_date) VALUES
(1, 'Alice Smith', 'alice.smith@example.com', '2023-01-15'),
(2, 'Bob Johnson', 'bob.johnson@example.com', '2023-02-20'),
(3, 'Charlie Brown', 'charlie.brown@example.com', '2023-03-10');
''')

# Insert sample data into Books table
cursor.execute('''
INSERT INTO Books (book_id, title, author, available) VALUES
(101, 'The Great Gatsby', 'F. Scott Fitzgerald', TRUE),
(102, 'To Kill a Mockingbird', 'Harper Lee', FALSE),
(103, '1984', 'George Orwell', TRUE);
''')

# Insert sample data into Loans table
cursor.execute('''
INSERT INTO Loans (loan_id, member_id, book_id, loan_date, return_date) VALUES
(1001, 1, 102, '2023-04-01', '2023-04-15'),
(1002, 2, 101, '2023-04-05', NULL),
(1003, 3, 103, '2023-04-10', NULL);
''')

# Commit the changes
conn.commit()

print("Database schema created and sample data inserted successfully.")

# You can now query the database, for example:
# cursor.execute("SELECT * FROM Members")
# print(cursor.fetchall())

# Close the connection when done
# conn.close()

```

 Database schema created and sample data inserted successfully.

OBSERVATION:

The INSERT queries in the successful cell populate the Members, Books, and Loans tables with sample data, allowing you to work with the database.

Task Description #3 – Basic Queries

Task: Use AI to generate a query to list all books borrowed by a specific member

OUTPUT:

Query using member name

sql

 Copy code

```
SELECT
    b.book_id,
    b.title,
    b.author,
    l.loan_date,
    l.return_date
FROM
    Books b
JOIN
    Loans l ON b.book_id = l.book_id
JOIN
    Members m ON l.member_id = m.member_id
WHERE
    m.name = 'John Doe';
```

Query using member_id

sql

 Copy code

```
SELECT
    b.book_id,
    b.title,
    b.author,
    l.loan_date,
    l.return_date
FROM
    Books b
JOIN
    Loans l ON b.book_id = l.book_id
WHERE
    l.member_id = 1;
```

OBSERVATION:

The query retrieves all books borrowed by a specific member by joining the Members, Loans, and Books tables. It displays each book's title, author, and loan details based on the member's ID or name.

Task Description #4 – Update and Delete Queries

Task: Generate queries with AI for:

- Updating a book's availability to FALSE when borrowed.
- Deleting a member record safely.

OUTPUT:

```
-- Update a book's availability to FALSE when borrowed
UPDATE Books
SET available = FALSE
WHERE book_id = 101;

-- Safely delete a member record (automatically deletes their loans)
DELETE FROM Members
WHERE member_id = 5;
```

OBSERVATION:

- The query updates the available status to prevent multiple borrowings of the same book.
- The ON DELETE CASCADE ensures that when a member is deleted, their related loan records are automatically removed — maintaining data integrity.