A. Consider the following schema for a Library Database:

BOOK (*Book_id, Title, Publisher_Name, Pub_Year*)

BOOK_AUTHORS (Book_id, Author_*Name*)

PUBLISHER (*Name, Address, Phone*)

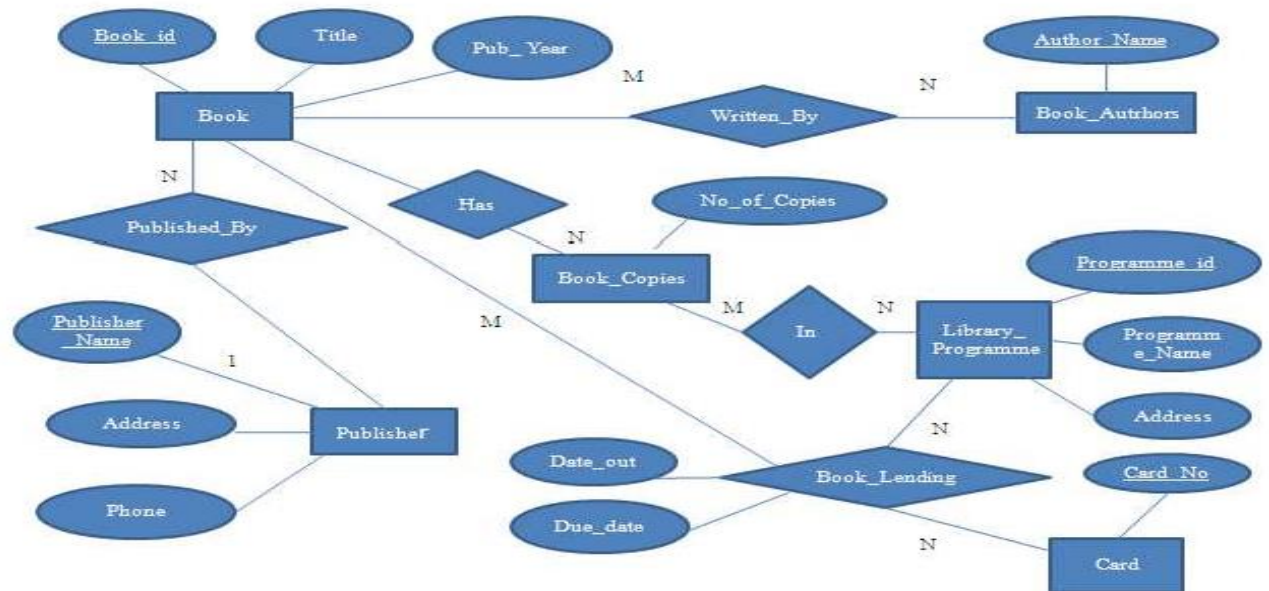**BOOK_COPIES** (*Book_id, Branch_id, No-of_Copies*)

BOOK_LENDING (*Book_id, Branch_id, Card_No, Date_Out, Due_Date*)

LIBRARY_BRANCH (*Branch_id, Branch_Name, Address*)

Write SQL queries to

1. Retrieve details of all books in the library – id, title, name of publisher, authors, numberof copies in each branch, etc.

2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan2017 to Jun 2017

3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.

4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.

5. Create a view of all books and its number of copies that are currently available in the Library.

ER Diagram:

Schema Diagram:

Book

Book_id	Title	Pub_Year	Publisher_Name

Book_Authors

Book_id	Author_Name

Publisher

Name	Phone	Address

Book_Copies

Book_id	Programme_id	No_of_Copies

Book_Lending

Book_id	Programme_id	Card_no	Date_out	Due_date

Library_Programme

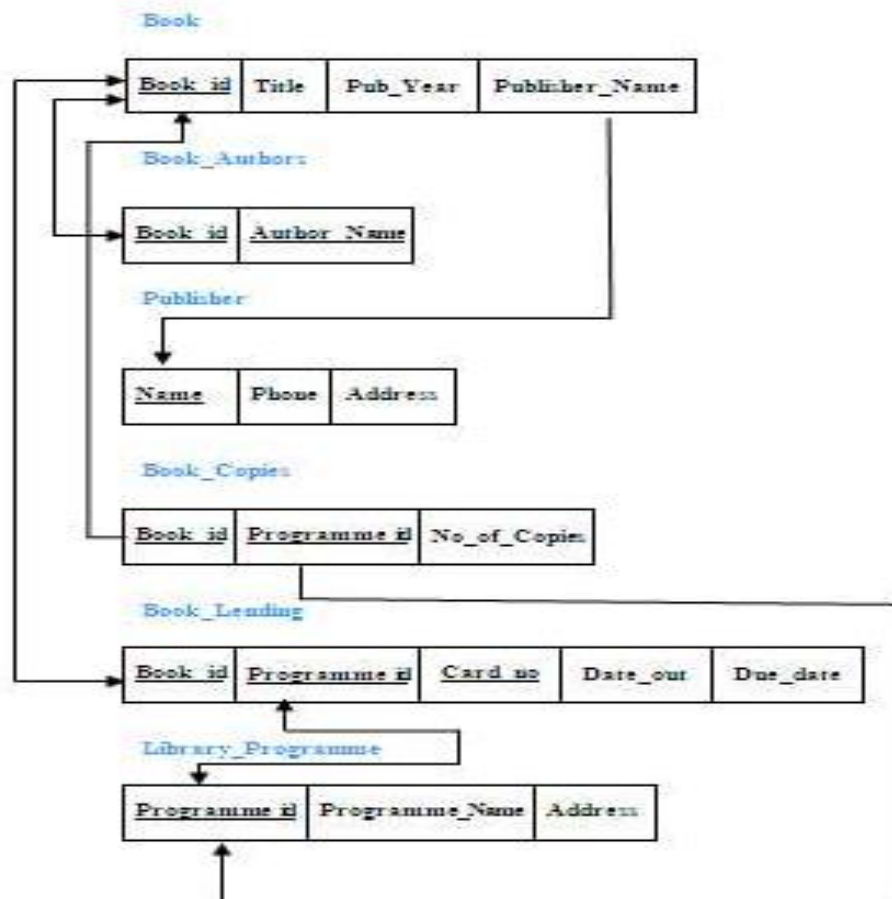| Programme_id	Programme_Name	Address

Table Creation

```
CREATE TABLE BOOK (
BOOK_ID INT (10) PRIMARY KEY,
TITLE VARCHAR (20),
PUB_YEAR VARCHAR (20),
PUBLISHER_NAME VARCHAR (20),
FOREIGN KEY (PUBLISHER_NAME) REFERENCES PUBLISHER (NAME) ON DELETE
CASCADE);


CREATE TABLE BOOK_AUTHORS (
AUTHOR_NAME VARCHAR (20),
BOOK_ID INT (10),
PRIMARY KEY (BOOK_ID, AUTHOR_NAME),
FOREIGN KEY (BOOK_ID) REFERENCES BOOK (BOOK_ID) ON DELETE CASCADE);

CREATE TABLE PUBLISHER (
NAME VARCHAR (20) PRIMARY KEY,
PHONE BIGINT (20),
ADDRESS VARCHAR (100));

CREATE TABLE BOOK_COPIES (
NO_OF_COPIES INT (5),
BOOK_ID INT (10),
BRANCH _ID INT (10),
PRIMARY KEY (BOOK_ID, BRANCH _ID),
FOREIGN KEY (BOOK_ID) REFERENCES BOOK (BOOK_ID) ON DELETE CASCADE,
FOREIGN KEY (BRANCH_ID) REFERENCES LIBRARY_ BRANCH (BRANCH _ID) ON
DELETE CASCADE);

CREATE TABLE BOOK_LENDING (
DATE_OUT DATE,
DUE_DATE DATE,
BOOK_ID INT (10),
BRANCH_ID INT (10),
CARD_NO INT (10),
PRIMARY KEY (BOOK_ID,BRANCH_ID, CARD_NO),
FOREIGN KEY (BOOK_ID) REFERENCES BOOK (BOOK_ID) ON DELETE CASCADE,
FOREIGN KEY (BRANCH_ID) REFERENCES LIBRARY_BRANCH(BRANCH_ID) ON
DELETE CASCADE,
FOREIGN KEY (CARD_NO) REFERENCES CARD (CARD_NO) ON DELETE CASCADE);


CREATE TABLE CARD
 (CARD_NO INT (10) PRIMARY KEY);
```

```
CREATE TABLE LIBRARY_BRANCH (
BRANCH_ID INT (10) PRIMARY KEY,
BRANCH_NAME VARCHAR (50),
ADDRESS VARCHAR (100));
```

Table Descriptions

DESC BOOK;

```
mysql> DESC BOOK;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| BOOK_ID         | int(10)     | NO   | PRI | NULL    |       |
| TITLE           | varchar(20) | YES  |     | NULL    |       |
| PUB_YEAR        | varchar(20) | YES  |     | NULL    |       |
| PUBLISHER_NAME  | varchar(20) | YES  | MUL | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

DESC BOOK_AUTHORS;

```
mysql> DESC BOOK_AUTHORS;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| AUTHOR_NAME | varchar(20) | NO   | PRI |         |       |
| BOOK_ID     | int(10)     | NO   | PRI | 0       |       |
+-------------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

DESC PUBLISHER;

```
mysql> DESC PUBLISHER;
+---------+--------------+------+-----+---------+-------+
| Field   | Type         | Null | Key | Default | Extra |
+---------+--------------+------+-----+---------+-------+
| NAME    | varchar(20)  | NO   | PRI | NULL    |       |
| PHONE   | bigint(20)   | YES  |     | NULL    |       |
| ADDRESS | varchar(100) | YES  |     | NULL    |       |
+---------+--------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

DESC BOOK_COPIES;

```
mysql> DESC  BOOK_COPIES;
+--------------+---------+------+-----+---------+-------+
| Field        | Type    | Null | Key | Default | Extra |
+--------------+---------+------+-----+---------+-------+
| NO_OF_COPIES | int(5)  | YES  |     | NULL    |       |
| BOOK_ID      | int(10) | NO   | PRI | NULL    |       |
| PROGRAMME_ID | int(10) | NO   | PRI | NULL    |       |
+--------------+---------+------+-----+---------+-------+
3 rows in set (0.00 sec)

mysql>
```

DESC BOOK_LENDING;

```
mysql>  DESC  BOOK_LENDING;
+--------------+----------+------+-----+---------+-------+
| Field        | Type     | Null | Key | Default | Extra |
+--------------+----------+------+-----+---------+-------+
| DATE_OUT     | date     | YES  |     | NULL    |       |
| DUE_DATE     | date     | YES  |     | NULL    |       |
| BOOK_ID      | int(10)  | NO   | PRI | NULL    |       |
| PROGRAMME_ID | int(10)  | NO   | PRI | NULL    |       |
| CARD_NO      | int(10)  | NO   | PRI | NULL    |       |
+--------------+----------+------+-----+---------+-------+
5 rows in set (0.03 sec)

mysql>
```

DESC CARD;

```
mysql> DESC  CARD;
+---------+---------+------+-----+---------+-------+
| Field   | Type    | Null | Key | Default | Extra |
+---------+---------+------+-----+---------+-------+
| CARD_NO | int(10) | NO   | PRI | NULL    |       |
+---------+---------+------+-----+---------+-------+
1 row in set (0.00 sec)

mysql> _
```

DESC LIBRARY_PROGRAMME

```
mysql> DESC  LIBRARY_PROGRAMME;
+----------------+--------------+------+-----+---------+-------+
| Field          | Type         | Null | Key | Default | Extra |
+----------------+--------------+------+-----+---------+-------+
| PROGRAMME_ID   | int(10)      | NO   | PRI | NULL    |       |
| PROGRAMME_NAME | varchar(50)  | YES  |     | NULL    |       |
| ADDRESS        | varchar(100) | YES  |     | NULL    |       |
+----------------+--------------+------+-----+---------+-------+
3 rows in set (0.00 sec)

mysql> _
```

Insertion of Values to Tables

```
INSERT INTO BOOK VALUES (1,'DBMS','JAN-2017', 'MCGRAW-HILL');
INSERT INTO BOOK VALUES (2,'ADBMS','JUN-2016','MCGRAW-HILL');
INSERT INTO BOOK VALUES (3, 'CD','SEP-2016','PEARSON');
INSERT INTO BOOK VALUES (4,' ALGORITHMS ','SEP-2015',' MIT');
INSERT INTO BOOK VALUES (5,'OS','MAY-2016','PEARSON');


INSERT INTO  BOOK_AUTHORS  VALUES ('NAVATHE', 1);
INSERT INTO  BOOK_AUTHORS  VALUES ('NAVATHE', 2);
INSERT INTO  BOOK_AUTHORS  VALUES ('ULLMAN',3);
INSERT INTO  BOOK_AUTHORS  VALUES ('CHARLES', 4);
INSERT INTO  BOOK_AUTHORS  VALUES('GALVIN', 5);



INSERT INTO  PUBLISHER VALUES ('MCGRAW-HILL', 9989076587,'BANGALORE');
INSERT INTO  PUBLISHER VALUES ('PEARSON', 9889076565,'NEWDELHI');
INSERT INTO  PUBLISHER VALUES ('PRENTICE HALL', 7455679345,'HYEDRABAD');
INSERT INTO  PUBLISHER VALUES ('WILEY', 8970862340,'CHENNAI');
INSERT INTO   PUBLISHER VALUES ('MIT',7756120238,'BANGALORE');

INSERT INTO BOOK_COPIES  VALUES (10, 1, 10);
INSERT INTO BOOK_COPIES  VALUES (5, 1, 11);
INSERT INTO BOOK_COPIES  VALUES (2, 2, 12);
INSERT INTO BOOK_COPIES  VALUES (5, 2, 13);
INSERT INTO BOOK_COPIES  VALUES (7, 3, 14);
INSERT INTO BOOK_COPIES  VALUES (1, 5, 10);
INSERT INTO BOOK_COPIES  VALUES (3, 4, 11);

INSERT INTO BOOK_LENDING  VALUES ('2017-01-01','2017-06-01', 1, 10, 101);
INSERT INTO BOOK_LENDING  VALUES ('2017-01-11 ','2017-03-11', 3, 14, 101);
INSERT INTO BOOK_LENDING  VALUES ('2017-02-21','2017-04-21', 2, 13, 101);
INSERT INTO BOOK_LENDING  VALUES ('2017-03-15 ','2017-07-15', 4, 11, 101);
INSERT INTO BOOK_LENDING  VALUES ('2017-04-12','2017-05-12', 1, 11, 104);

INSERT INTO CARD VALUES (100);
INSERT INTO CARD VALUES (101);
INSERT INTO CARD VALUES (102);
INSERT INTO CARD VALUES (103);
INSERT INTO CARD VALUES (104);

INSERT INTO  LIBRARY_BRANCH  VALUES (10,'VIJAY NAGAR','MYSURU');
INSERT INTO  LIBRARY_ BRANCH  VALUES (11,'VIDYANAGAR','HUBLI');
INSERT INTO  LIBRARY_ BRANCH  VALUES(12,'KUVEMPUNAGAR','MYSURU');
INSERT INTO  LIBRARY_ BRANCH  VALUE(13,'RAJAJINAGAR','BANGALORE');
INSERT INTO  LIBRARY_ BRANCH  VALUES (14,'MANIPAL','UDUPI');
```

SELECT * FROM BOOK;

BOOK_ID	TITLE	PUB_YEAR	PUBLISHER_NAME
1	DBMS	Jan-2017	MCGRAW-HILL
2	ADBMS	Jun-2017	MCGRAW-HILL
3	CD	Sep-2016	PEARSON
4	ALGORITHMS	Sep-2015	MIT
5	OS	May-2016	PEARSON

SELECT * FROM BOOK_AUTHORS;

AUTHOR_NAME	BOOK_ID
NAVATHE	1
NAVATHE	2
ULLMAN	3
CHARLES	4
GALVIN	5

SELECT * FROM   PUBLISHER;

NAME	PHONE	ADDRESS
MCGRAW-HILL	9989076587	BANGALORE
MIT	7756120238	BANGALORE
PEARSON	9889076565	NEWDELHI
PRENTICE HALL	7455679345	HYEDRABAD
WILEY	8970862340	CHENNAI

SELECT * FROM BOOK_COPIES;

NO_OF_COPIES	BOOK_ID	BRANCH _ID
10	1	10
5	1	11
2	2	12
5	2	13
7	3	14
1	5	10
3	4	11

SELECT * FROM BOOK_LENDING;

DATEOUT	DUEDATE	BOOKID	BRANCH _ID	CARD_NO
2017-01-01	2017-06-01	1	10	
2017-01-11	2017-03-11	3	4	101
2017-02-21	2017-04-21	2	13	101
2017-03-15	2017-07-15	4	11	101
2017-04-12	2017-05-12	1	11	104

SELECT * FROM CARD;

CARDNO
101
102
103
104
105

SELECT * FROM LIBRARY_BRANCH;

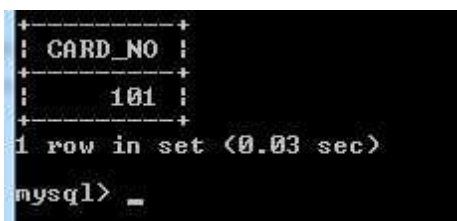| BRANCH _ID	BRANCH _NAME	ADDRESS
10	VIJAY NAGAR	MYSURU
11	VIDYANAGAR	HUBLI
12	KUVEMPUNAGAR	MYSURU
13	RAJAJINAGAR	BANGALORE
14	MANIPAL	UDUPI

Queries:

1. Retrieve details of all books in the library– id, title, name of publisher, authors, number of copies in each branch, etc.

SELECT B.BOOK_ID, B.TITLE, B.PUBLISHER_NAME, A.AUTHOR_NAME,
C.NO_OF_COPIES, L.PROGRAMME_ID
FROM BOOK B, BOOK_AUTHORS A, BOOK_COPIES C, LIBRARY_ BRANCH L
WHERE B.BOOK_ID=A.BOOK_ID AND B.BOOK_ID=C.BOOK_ID AND
L. BRANCH _ID=C.PROGRAMME_ID;

BOOK_ ID	TITLE	PUBLISHER_ NAME	AUTHOR_ NAME	NO_ OF_COPIES	BRANCH _ID
1	DBMS	MCGRAW-HILL	NAVATHE	10	10
1	DBMS	MCGRAW-HILL	NAVATHE	5	11
2	ADBMS	MCGRAW-HILL	NAVATHE	2	12
2	ADBMS	MCGRAW-HILL	NAVATHE	5	13
3	CD	PEARSON	ULLMAN	7	14
4	ALGORITHMS	MIT	CHARLES	1	11
5	OS	PEARSON	GALVIN	3	10

2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017.

SELECT CARD_NO
FROM BOOK_LENDING
WHERE DATE_OUT
BETWEEN '2017-01-01'AND '2017-07-01'
GROUP BY CARD_NO HAVING COUNT(*)>3;

```
+---------+
| CARD_NO |
+---------+
|     101 |
+---------+
1 row in set (0.03 sec)

mysql> _
```

3. **Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.**

DELETE FROM BOOK WHERE BOOK_ID=3;

```
mysql> SELECT * FROM BOOK;
+---------+------------+----------+----------------+
| BOOK_ID | TITLE      | PUB_YEAR | PUBLISHER_NAME |
+---------+------------+----------+----------------+
|       1 | DBMS       | JAN-2017 | MCGRAW-HILL    |
|       2 | ADBMS      | JUN-2016 | MCGRAW-HILL    |
|       3 | CD         | SEP-2016 | PEARSON        |
|       4 | ALGORITHMS | SEP-2015 | MIT            |
|       5 | OS         | MAY-2016 | PEARSON        |
+---------+------------+----------+----------------+
5 rows in set (0.00 sec)

mysql> DELETE FROM BOOK WHERE BOOK_ID=3;
Query OK, 1 row affected (0.03 sec)

mysql> SELECT * FROM BOOK;
+---------+------------+----------+----------------+
| BOOK_ID | TITLE      | PUB_YEAR | PUBLISHER_NAME |
+---------+------------+----------+----------------+
|       1 | DBMS       | JAN-2017 | MCGRAW-HILL    |
|       2 | ADBMS      | JUN-2016 | MCGRAW-HILL    |
|       4 | ALGORITHMS | SEP-2015 | MIT            |
|       5 | OS         | MAY-2016 | PEARSON        |
+---------+------------+----------+----------------+
4 rows in set (0.00 sec)
```

4. **Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.**

CREATE VIEW VW_PUBLICATION AS
SELECT PUB_YEAR
FROM BOOK;
SELECT * FROM VW_PUBLICATION

```
mysql> SELECT * FROM VW_PUBLICATION;
+----------+
| PUB_YEAR |
+----------+
| JAN-2017 |
| JUN-2016 |
| SEP-2016 |
| SEP-2015 |
| MAY-2016 |
+----------+
5 rows in set (0.00 sec)
```

5. **Create a view of all books and its number of copies that are currently available in the Library.**
CREATE VIEW VW_BOOKS AS
SELECT B.BOOK_ID, B.TITLE, C.NO_OF_COPIES
FROM BOOK B, BOOK_COPIES C, LIBRARY_ BRANCH L
WHERE B.BOOK_ID=C.BOOK_ID
AND C. BRANCH _ID=L. BRANCH _ID;

SELECT * FROM VW_BOOKS;

```
mysql> SHOW TABLES;
+------------------+
| Tables_in_library |
+------------------+
| book             |
| book_authors     |
| book_copies      |
| book_lending     |
| card             |
| library_programme |
| publisher        |
| vw_books         |
+------------------+
8 rows in set (0.00 sec)

mysql> SELECT * FROM  VW_BOOKS;
+---------+-----------+--------------+
| BOOK_ID | TITLE     | NO_OF_COPIES |
+---------+-----------+--------------+
|       1 | DBMS      |           10 |
|       1 | DBMS      |            5 |
|       2 | ADBMS     |            2 |
|       2 | ADBMS     |            5 |
|       3 | CD        |            7 |
|       5 | OS        |            1 |
|       4 |  ALGORITHMS |          3 |
+---------+-----------+--------------+
7 rows in set (0.00 sec)

mysql>
```