## 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.

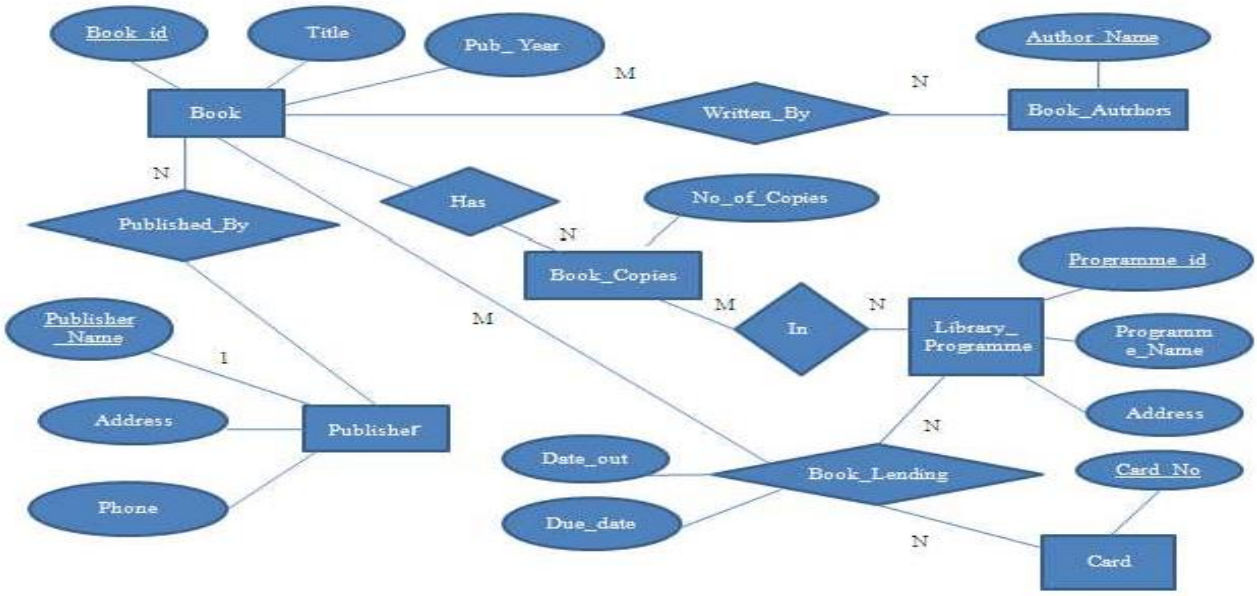
**2.** Get the particulars of borrowers who have borrowed more than 3 books, but from Jan2017 to Jun 2017

**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:**

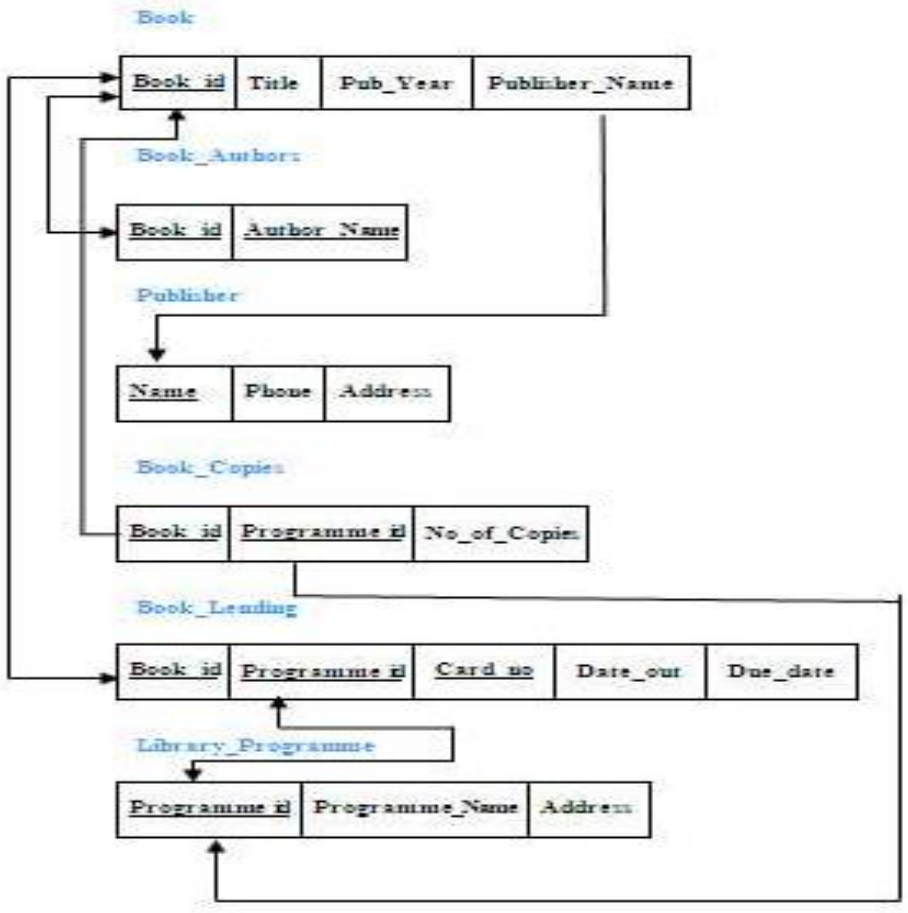


**Table Creation**

```
CREATE TABLE BOOK (
BOOK_ID NUMBER (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 NUMBER (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 NUMBER (20),
ADDRESS VARCHAR (100));

CREATE TABLE BOOK_COPIES (
NO_OF_COPIES NUMBER (5),
BOOK_ID NUMBER (10),
BRANCH _ID NUMBER (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 NUMBER (10),
BRANCH_ID NUMBER (10),
CARD_NO NUMBER (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 NUMBER (10) PRIMARY KEY);
```

CREATE TABLE LIBRARY_BRANCH (
BRANCH_ID NUMBER (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;
```

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>
```