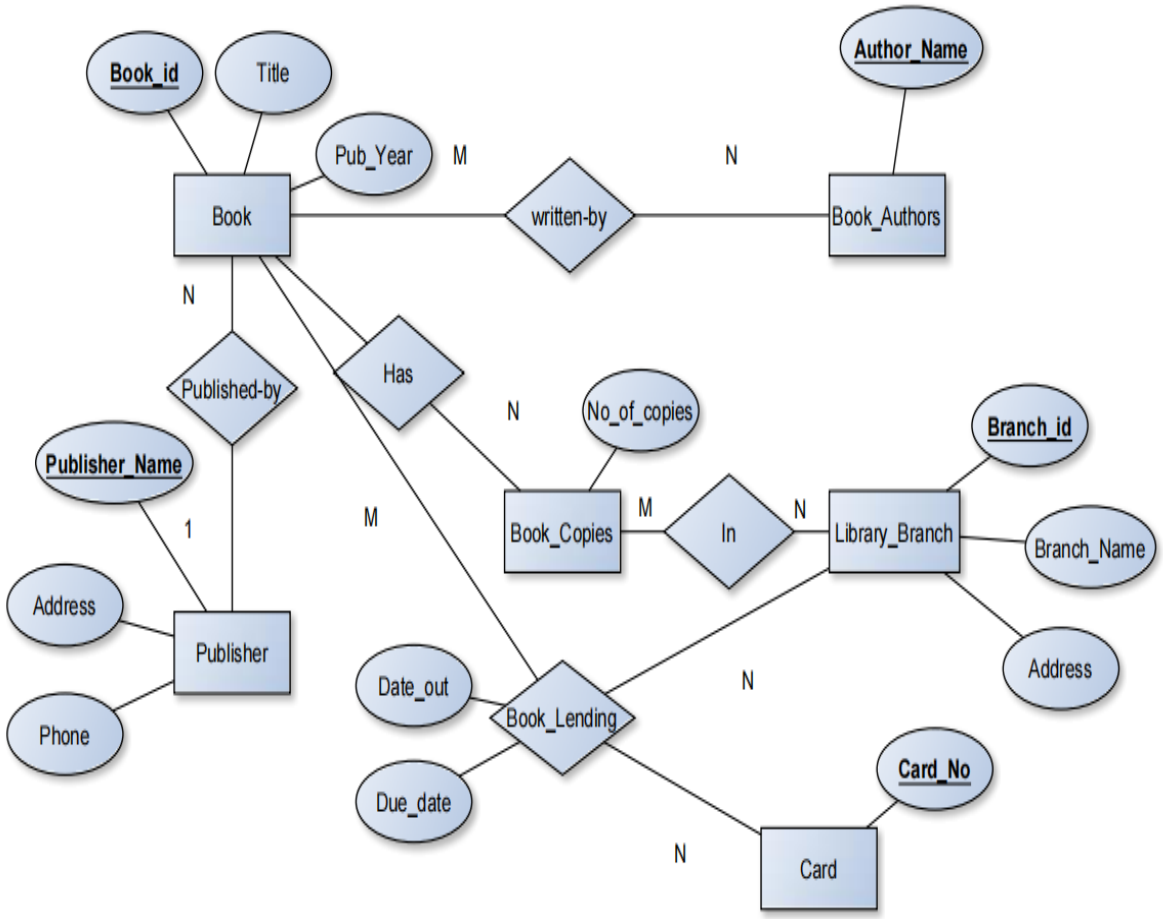
2. Consider the following schema for a Library Database:
BOOK (*Book_id, Title, Publisher_Name, Pub_Year*)
BOOK_AUTHORS (Book_id, Author_*Name*)
PUBLISHER (*Name, Address, Phone*)
BOOK_COPIES (*Book_id, Branch_id, No-of_Copies*)
BOOK_LENDING (*Book_id, Branch_id, Card_No, Date_Out, Due_Date*)
LIBRARY_BRANCH (*Branch_id, Branch_Name, Address*)
Write SQL queries to
1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each branch, etc.
2. Get the particulars of borrowers who have borrowed more than 3 books, but from 1st Jan 2017 to 30th Sep 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.

Solution:
Entity-Relationship Diagram



Relational Schema:

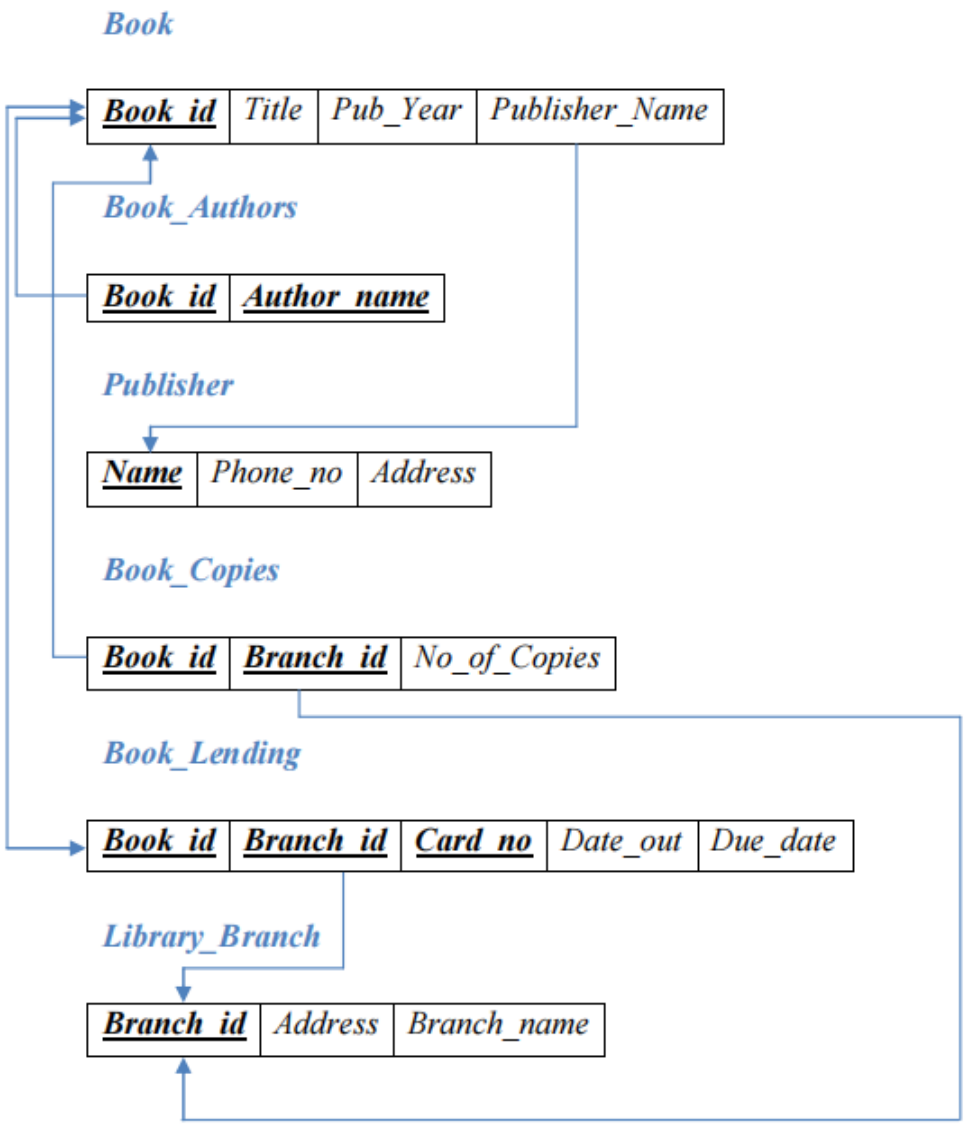


Table Creation :

```
CREATE TABLE PUBLISHER
(PUBL_NAME VARCHAR (20) PRIMARY KEY,
PHONE BIGINT,
ADDRESS VARCHAR (20));


CREATE TABLE BOOK
(BOOK_ID INTEGER PRIMARY KEY,
TITLE VARCHAR (20),
PUB_YEAR VARCHAR (20),
PUBL_NAME varchar(20),
FOREIGN KEY (PUBL_NAME) REFERENCES PUBLISHER (PUBL_NAME) ON DELETE
CASCADE);
```

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


CREATE TABLE LIBRARY_BRANCH
(BRANCH_ID INTEGER PRIMARY KEY,
BRANCH_NAME VARCHAR (50),
ADDRESS VARCHAR (50));


CREATE TABLE BOOK_COPIES
(NO_OF_COPIES INTEGER,
Book_id int,
branch_id int,
FOREIGN KEY (BOOK_ID) REFERENCES BOOK (BOOK_ID) ON DELETE CASCADE,
FOREIGN KEY (BRANCH_ID) REFERENCES LIBRARY_BRANCH (BRANCH_ID) ON DELETE
CASCADE,
PRIMARY KEY (BOOK_ID, BRANCH_ID));


CREATE TABLE CARD
(CARD_NO INTEGER PRIMARY KEY);


CREATE TABLE BOOK_LENDING
(DATE_OUT DATE,
DUE_DATE DATE,
Book_id int,
Branch_id int,
card_no int,
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,
PRIMARY KEY (BOOK_ID, BRANCH_ID, CARD_NO));
```

Table Descriptions

DESC PUBLISHER;

Field	Type	Null	Key	Default	Extra
PUBL_NAME	varchar(20)	NO	PRI	NULL	
PHONE	bigint	YES		NULL	
ADDRESS	varchar(20)	YES		NULL	

```
SQL> DESC BOOK;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 BOOK_ID                                   NOT NULL NUMBER(38)
 TITLE                                              VARCHAR2(20)
 PUB_YEAR                                           VARCHAR2(20)
 PUBLISHER_NAME                                     VARCHAR2(20)
```

DESC BOOK_AUTHORS;

```
SQL> DESC BOOK_AUTHORS;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 AUTHOR_NAME                               NOT NULL VARCHAR2(20)
 BOOK_ID                                   NOT NULL NUMBER(38)
```

DESC LIBRARY_BRANCH;

```
SQL> DESC LIBRARY_BRANCH;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 BRANCH_ID                                 NOT NULL NUMBER(38)
 BRANCH_NAME                                        VARCHAR2(50)
 ADDRESS                                            VARCHAR2(50)
```

DESC BOOK_COPIES;

```
SQL> DESC BOOK_COPIES;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 NO_OF_COPIES                                       NUMBER(38)
 BOOK_ID                                   NOT NULL NUMBER(38)
 BRANCH_ID                                 NOT NULL NUMBER(38)
```

DESC CARD;

```
SQL> DESC CARD;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 CARD_NO                                   NOT NULL NUMBER(38)
```

DESC BOOK_LENDING;

```
SQL> desc book_lending;
 Name
 ----------------------------------------------------------------------------------------------------
 DATE_OUT
 DUE_DATE
 BOOK_ID
 BRANCH_ID
 CARD_NO
```

Insertion of Values to Tables

INSERT INTO PUBLISHER VALUES ('MCGRAW-HILL', 9989076587, 'BANGALORE');
INSERT INTO PUBLISHER VALUES ('PEARSON', 9889076565, 'NEWDELHI');
INSERT INTO PUBLISHER VALUES ('Jaico', 7455679345, 'HYDRABAD');
INSERT INTO PUBLISHER VALUES ('LIVRE', 8970862340, 'CHENNAI');
INSERT INTO PUBLISHER VALUES ('PLANETA', 7756120238, 'BANGALORE');

INSERT INTO BOOK VALUES (1,'DBMS','2017-01-18', 'MCGRAW-HILL');
INSERT INTO BOOK VALUES (2,'ADBMS','2016-06-16', 'MCGRAW-HILL');
INSERT INTO BOOK VALUES (3,'CN','2016-09-26', 'PEARSON');
INSERT INTO BOOK VALUES (4,'CG','2015-05-18', 'PLANETA');
INSERT INTO BOOK VALUES (5,'OS','2016-05-09', 'PEARSON');

INSERT INTO BOOK_AUTHORS VALUES ('NAVATHE', 1);
INSERT INTO BOOK_AUTHORS VALUES ('NAVATHE', 2);
INSERT INTO BOOK_AUTHORS VALUES ('TANENBAUM', 3);
INSERT INTO BOOK_AUTHORS VALUES ('EDWARD ANGEL', 4);
INSERT INTO BOOK_AUTHORS VALUES ('GALVIN', 5);

INSERT INTO LIBRARY_BRANCH VALUES (10,'Branch1','BANGALORE');
INSERT INTO LIBRARY_BRANCH VALUES (11,'Branch2','BANGALORE');
INSERT INTO LIBRARY_BRANCH VALUES (12,'Branch3', 'BANGALORE');
INSERT INTO LIBRARY_BRANCH VALUES (13,'Branch4','MANGALORE');

```
INSERT INTO LIBRARY_BRANCH VALUES (14,'Branch5','Mysore');


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 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 BOOK_LENDING VALUES ('2017-01-21','2017-06-21', 1, 10, 101);
INSERT INTO BOOK_LENDING VALUES ('2017-02-19','2017-07-19', 3, 14, 101);
INSERT INTO BOOK_LENDING VALUES ('2017-02-26','2017-07-26', 2, 13, 101);
INSERT INTO BOOK_LENDING VALUES ('2017-03-15','2017-09-15', 4, 11, 101);
INSERT INTO BOOK_LENDING VALUES ('2017-04-12','2017-10-12', 1, 11, 104);
```

Display the records of tables:

```
select * from publisher;
```

PUBL_NAME	PHONE	ADDRESS
Jaico	7455679345	HYDRABAD
LIVRE	8970862340	CHENNAI
MCGRAW-HILL	9989076587	BANGALORE
PEARSON	9889076565	NEWDELHI
PLANETA	7756120238	BANGALORE

```
select * from book;
```

BOOK_ID	TITLE	PUB_YEAR	PUBL_NAME
1	DBMS	2017-01-18	MCGRAW-HILL
2	ADBMS	2016-06-16	MCGRAW-HILL
3	CN	2016-09-26	PEARSON
4	CG	2015-05-18	PLANETA
5	OS	2016-05-09	PEARSON

```
select * from book_authors;
```

AUTHOR_NAME	BOOK_ID
NAVATHE	1
NAVATHE	2
TANENBAUM	3
EDWARD ANGEL	4
GALVIN	5

```
select * from library_branch;
```

BRANCH_ID	BRANCH_NAME	ADDRESS
10	Branch1	BANGALORE
11	Branch2	BANGALORE
12	Branch3	BANGALORE
13	Branch4	MANGALORE
14	Branch5	Mysore

```
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
3	4	11
1	5	10

```
select * from card;
```

CARD_NO
100
101
102
103
104

```
select * from book_lending;
```

DATE_OUT	DUE_DATE	Book_id	Branch_id	card_no
2017-01-21	2017-06-21	1	10	101
2017-04-12	2017-10-12	1	11	104
2017-02-26	2017-07-26	2	13	101
2017-02-19	2017-07-19	3	14	101
2017-03-15	2017-09-15	4	11	101

Create database
Ex: create database lab2;

Use database
use lab2;

Queries:

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

Sol:

```
Use lab2;
SELECT B.BOOK_ID, B.TITLE, B.PUBL_NAME, A.AUTHOR_NAME,
C.NO_OF_COPIES, L.BRANCH_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.BRANCH_ID;
```

Output:

BOOK_ID	TITLE	PUBL_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	CN	PEARSON	TANENBAUM	7	14
4	CG	PLANETA	EDWARD ANGEL	3	11
5	OS	PEARSON	GALVIN	1	10

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

Sol:

```
use lab2;

SELECT CARD_NO
FROM BOOK_LENDING
WHERE DATE_OUT BETWEEN '2017-01-21' AND '2017-09-15'
GROUP BY CARD_NO
HAVING COUNT(*)>3;
```

Output:

	CARD_NO
▶	101

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

Sol:

```
DELETE FROM BOOK
WHERE BOOK_ID=3;
```

Output:

```
select * from book;
```

BOOK_ID	TITLE	PUB_YEAR	PUBL_NAME
1	DBMS	2017-01-18	MCGRAW-HILL
2	ADBMS	2016-06-16	MCGRAW-HILL
4	CG	2015-05-18	PLANETA
5	OS	2016-05-09	PEARSON

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

Sol:

CREATE VIEW V_PUBLICATION AS
SELECT PUB_YEAR
FROM BOOK;

```
select * from v_publication;
```

Output:

PUB_YEAR
2017-01-18
2016-06-16
2015-05-18
2016-05-09

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

Sol:

CREATE VIEW V_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 v_books;
```

Output:

BOOK_ID	TITLE	NO_OF_COPIES
1	DBMS	10
1	DBMS	5
2	ADBMS	2
2	ADBMS	5
4	CG	3
5	OS	1

6. List the book id, title ,publisher name, author name along with total number of copies of each textbook and sort the records in the descending order of book_id.

```
SELECT B.BOOK_ID, B.TITLE, B.PUBL_NAME, A.AUTHOR_NAME,SUM(NO_OF_COPIES)
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.BRANCH_ID
group by book_id
order by book_id DESC;
```

output:

BOOK_ID	TITLE	PUBL_NAME	AUTHOR_NAME	SUM(NO_OF_COPIES)
5	OS	PEARSON	GALVIN	1
4	CG	PLANETA	EDWARD ANGEL	3
2	ADBMS	MCGRAW-HILL	NAVATHE	7
1	DBMS	MCGRAW-HILL	NAVATHE	15

7. List the book id, title, publisher name, along with total number of copies of each textbook where number of copies is greater than 2 and sort the records in the ascending order of book_id.

```
SELECT B.BOOK_ID, B.TITLE, B.PUBL_NAME, A.AUTHOR_NAME,SUM(NO_OF_COPIES)
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.BRANCH_ID
group by book_id
having SUM(NO_OF_COPIES)>2
order by book_id;
```

output:

BOOK_ID	TITLE	PUBL_NAME	AUTHOR_NAME	SUM(NO_OF_COPIES)
1	DBMS	MCGRAW-HILL	NAVATHE	15
2	ADBMS	MCGRAW-HILL	NAVATHE	7
4	CG	PLANETA	EDWARD ANGEL	3

8. Retrieve the book id along with date of publication details of books which are published in 2016.

```
SELECT BOOK_ID,PUB_YEAR FROM BOOK WHERE PUB_YEAR LIKE '2016%';
```

book_id	pub_year
2	2016-06-16
5	2016-05-09