DBMS LABORATORY WITH MINI PROJECT (18CSL58)

Part A- SQL Programming

PART A – PROGRAM 1

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)

SQL queries to be executed

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

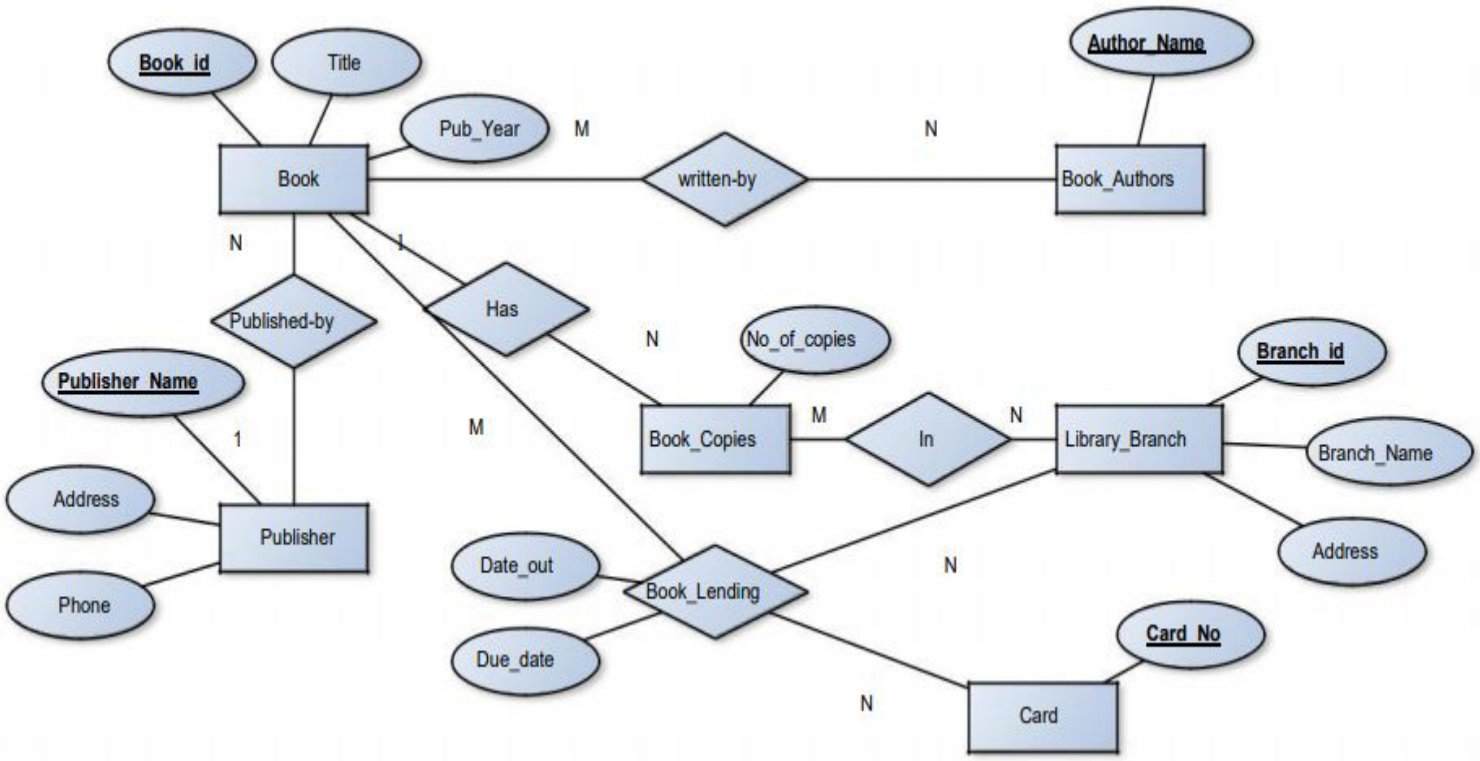
2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017

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

ENTITY-RELATIONSHIP DIAGRAM



SCHEMA DIAGRAM

CREATING TABLES

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

- CREATE TABLE **BOOK** (BOOK_ID INT, P_NAME VARCHAR (20), P_YEAR INT (4), TITLE VARCHAR (20), PRIMARY KEY (BOOK_ID));

- CREATE TABLE BOOK_AUTHORS (BOOK_ID INT, A_NAME VARCHAR (20), PRIMARY KEY (BOOK_ID, AUTHOR_NAME));

CREATING TABLES

- CREATE TABLE LIBRARY_BRANCH (BRANCH_ID INT, BRANCH_NAME VARCHAR (20), ADDRESS VARCHAR (20), PRIMARY KEY (BRANCH_ID));

- CREATE TABLE BOOK_COPIES (BOOK_ID INT, BRANCH_ID INT, NO_OF_COPIES INT, PRIMARY KEY (BOOK_ID, BRANCH_ID));

- CREATE TABLE BOOK_LENDING (BOOK_ID INT, BRANCH_ID INT, CARD_NO INT, DATE_OUT DATE, DUE_DATE DATE, PRIMARY KEY (BOOK_ID, BRANCH_ID, CARD_NO));

ADDING FOREIGN KEYS

- alter table **book** add foreign key(P_name) references publisher(name);
- alter table **book_authors** add constraint fk_book foreign key(book_id) references book(book_id) on delete cascade;
- alter table **book_copies** add constraint fk_bk foreign key(book_id) references book(book_id) on delete cascade;
- alter table **book_copies** add constraint fk_branch foreign key(branch_id) references library_branch(branch_id) on delete cascade;
- alter table **book_lending** add constraint fklending_bk foreign key(book_id) references book(book_id) on delete cascade;
- alter table **book_lending** add constraint fklending_branch foreign key(branch_id) references library_branch(branch_id) on delete cascade;

TABLE STRUCTURE

```
mysql> desc book;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| Book_id | int(11)     | NO   | PRI | NULL    |       |
| P_name  | varchar(20) | YES  | MUL | NULL    |       |
| P_year  | int(4)      | YES  |     | NULL    |       |
| title   | varchar(20) | YES  |     | NULL    |       |
+---------+-------------+------+-----+---------+-------+
```

```
mysql> desc publisher;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| name    | varchar(20) | NO   | PRI | NULL    |       |
| phone   | bigint(10)  | YES  |     | NULL    |       |
| address | varchar(20) | YES  |     | NULL    |       |
+---------+-------------+------+-----+---------+-------+
```

TABLE STRUCTURE

```
mysql> desc book_authors;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| book_id | int(11)     | NO   | PRI | NULL    |       |
| a_name  | varchar(20) | NO   | PRI | NULL    |       |
+---------+-------------+------+-----+---------+-------+
```

```
mysql> desc book_copies;
+--------------+---------+------+-----+---------+-------+
| Field        | Type    | Null | Key | Default | Extra |
+--------------+---------+------+-----+---------+-------+
| book_id      | int(11) | NO   | PRI | NULL    |       |
| branch_id    | int(11) | NO   | PRI | NULL    |       |
| no_of_copies | int(11) | YES  |     | NULL    |       |
+--------------+---------+------+-----+---------+-------+
```

TABLE CREATION

```
mysql> desc book_lending;
+-----------+---------+------+-----+---------+-------+
| Field     | Type    | Null | Key | Default | Extra |
+-----------+---------+------+-----+---------+-------+
| book_id   | int(11) | NO   | PRI | NULL    |       |
| branch_id | int(11) | NO   | PRI | NULL    |       |
| card_no   | int(11) | NO   | PRI | NULL    |       |
| date_out  | date    | YES  |     | NULL    |       |
| due_date  | date    | YES  |     | NULL    |       |
+-----------+---------+------+-----+---------+-------+
```

```
mysql> desc library_branch;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| branch_id   | int(11)     | NO   | PRI | NULL    |       |
| branch_name | varchar(20) | YES  |     | NULL    |       |
| address     | varchar(20) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
```

INSERTING VALUES INTO TABLES

```
mysql> insert into publisher values
    -> ('Nandhi', 967956422, 'Bangalore'),
    -> ('Sudha', 966907656, 'Mysore'),
    -> ('Star', 885567934, 'Mysore'),
    -> ('MC PUB', 970862340, 'Tumkur'),
    -> ('Pearson', 785612238, 'Davangere');
```

```
mysql> select * from publisher;
+---------+-----------+-----------+
| name    | phone     | address   |
+---------+-----------+-----------+
| MC PUB  | 970862340 | Tumkur    |
| Nandhi  | 967956422 | Bangalore |
| Pearson | 785612238 | Davangere |
| Star    | 885567934 | Mysore    |
| Sudha   | 966907656 | Mysore    |
+---------+-----------+-----------+
```

INSERTING VALUES INTO TABLES

```
mysql> insert into book values
    -> (1234, 'Nandhi', 2015, 'Data Structures'),
    -> (1235, 'Nandhi', 2010, 'Computer Networs'),
    -> (1236, 'Sudha', 2011, 'Computer Graphics'),
    -> (1237,'Star', 2015, 'Network Security'),
    -> (1238, 'MC PUB', 2016, 'Logic Design');
```

```
mysql> select * from book;
+---------+--------+--------+------------------+
| Book_id | P_name | P_year | title            |
+---------+--------+--------+------------------+
|    1234 | Nandhi |   2015 | Data Structures  |
|    1235 | Nandhi |   2010 | Computer Networs |
|    1236 | Sudha  |   2011 | Computer Graphics|
|    1237 | Star   |   2015 | Network Security |
|    1238 | MC PUB |   2016 | Logic Design     |
+---------+--------+--------+------------------+
```

INSERTING VALUES INTO TABLES

```
mysql> insert into book_authors values
    -> (1234,'Raghunandan'),
    -> (1235,'Albert'),
    -> (1236,'John'),
    -> (1236,'Steven'),
    -> (1237,'Stallings'),
    -> (1238, 'Kiran');
```

```
mysql> select * from book_authors;
+---------+-------------+
| book_id | a_name      |
+---------+-------------+
|    1234 | Raghunandan |
|    1235 | Albert      |
|    1236 | John        |
|    1236 | Steven      |
|    1237 | Stallings   |
|    1238 | Kiran       |
+---------+-------------+
```

INSERTING VALUES INTO TABLES

```
mysql> insert into Library_branch values
    -> (201, 'Main', 'Gokulam,Mysore'),
    -> (202, 'RR Branch', 'RR 5th Block'),
    -> (203, 'VN Branch','Vijay Nagar'),
    -> (205, 'City', 'Richmond Road'),
    -> (206, 'Jayanagar', '1st Block Jayanagar');
```

```
mysql> select * from Library_branch;
+-----------+-------------+---------------------+
| branch_id | branch_name | address             |
+-----------+-------------+---------------------+
|       201 | Main        | Gokulam,Mysore      |
|       202 | RR Branch   | RR 5th Block        |
|       203 | VN Branch   | Vijay Nagar         |
|       205 | City        | Richmond Road       |
|       206 | Jayanagar   | 1st Block Jayanagar |
+-----------+-------------+---------------------+
5 rows in set (0.00 sec)
```

INSERTING VALUES INTO TABLES

```
mysql> insert into book_copies values
    -> (1234, 201, 15),
    -> (1234, 202, 10),
    -> (1235, 203, 13),
    -> (1235, 206, 10),
    -> (1236, 205, 11),
    -> (1236, 202, 7),
    -> (1237, 205,8),
    -> (1238, 201, 12);
```

```
mysql> select * from book_copies;
+---------+-----------+--------------+
| book_id | branch_id | no_of_copies |
+---------+-----------+--------------+
|    1234 |       201 |           15 |
|    1234 |       202 |           10 |
|    1235 |       203 |           13 |
|    1235 |       206 |           10 |
|    1236 |       202 |            7 |
|    1236 |       205 |           11 |
|    1237 |       205 |            8 |
|    1238 |       201 |           12 |
+---------+-----------+--------------+
```

INSERTING VALUES INTO TABLES

```
mysql> insert into book_lending values
    -> (1234, 201, 11, '2017-05-12', '2017-05-27'),
    -> (1235, 203, 11, '2017-05-30','2017-06-15'),
    -> (1236, 202, 11, '2017-08-02','2017-08-17'),
    -> (1237, 205, 22, '2019-04-25','2019-05-14'),
    -> (1238, 201, 33, '2017-04-20', '2017-05-05'),
    -> (1234, 201, 44, '2020-05-16', '2020-06-01'),
    -> (1238, 201, 11, '2017-09-01', '2017-09-15');
```

```
mysql> select * from book_lending;
+---------+-----------+---------+------------+------------+
| book_id | branch_id | card_no | date_out   | due_date   |
+---------+-----------+---------+------------+------------+
|    1234 |       201 |      11 | 2017-05-12 | 2017-05-27 |
|    1234 |       201 |      44 | 2020-05-16 | 2020-06-01 |
|    1235 |       203 |      11 | 2017-05-30 | 2017-06-15 |
|    1236 |       202 |      11 | 2017-08-02 | 2017-08-17 |
|    1237 |       205 |      22 | 2019-04-25 | 2019-05-14 |
|    1238 |       201 |      11 | 2017-09-01 | 2017-09-15 |
|    1238 |       201 |      33 | 2017-04-20 | 2017-05-05 |
+---------+-----------+---------+------------+------------+
```

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

```
mysql> select book.book_id, title, p_name, a_name, branch_id, no_of_copies
    -> from book natural join book_authors natural join book_copies;
+---------+-------------------+--------+------------+-----------+--------------+
| book_id | title             | p_name | a_name     | branch_id | no_of_copies |
+---------+-------------------+--------+------------+-----------+--------------+
|    1234 | Data Structures   | Nandhi | Raghunandan |       201 |           15 |
|    1234 | Data Structures   | Nandhi | Raghunandan |       202 |           10 |
|    1235 | Computer Networs  | Nandhi | Albert     |       203 |           13 |
|    1235 | Computer Networs  | Nandhi | Albert     |       206 |           10 |
|    1236 | Computer Graphics | Sudha  | John       |       202 |            7 |
|    1236 | Computer Graphics | Sudha  | John       |       205 |           11 |
|    1236 | Computer Graphics | Sudha  | Steven     |       202 |            7 |
|    1236 | Computer Graphics | Sudha  | Steven     |       205 |           11 |
|    1237 | Network Security  | Star   | Stallings  |       205 |            8 |
|    1238 | Logic Design      | MC PUB | Kiran      |       201 |           12 |
+---------+-------------------+--------+------------+-----------+--------------+
```

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

```
mysql> select card_no
    -> from book_lending
    -> where date_out between '2017-01-01' and '2017-07-01'
    -> group by card_no
    -> having count(*) >3;
Empty set (0.00 sec)
```

```
mysql> select card_no
    -> from book_lending
    -> where date_out between '2017-01-01' and '2017-10-01'
    -> group by card_no
    -> having count(*) >3;
+---------+
| card_no |
+---------+
|      11 |
+---------+
1 row in set (0.00 sec)
```

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

```
mysql> select * from book;
+---------+--------+--------+-------------------+
| Book_id | P_name | P_year | title             |
+---------+--------+--------+-------------------+
|    1234 | Nandhi |   2015 | Data Structures   |
|    1235 | Nandhi |   2010 | Computer Networs  |
|    1236 | Sudha  |   2011 | Computer Graphics |
|    1237 | Star   |   2015 | Network Security  |
|    1238 | MC PUB |   2016 | Logic Design      |
+---------+--------+--------+-------------------+
5 rows in set (0.00 sec)

mysql> delete from book where book_id=1238;
Query OK, 1 row affected (0.05 sec)

mysql> select * from book;
+---------+--------+--------+-------------------+
| Book_id | P_name | P_year | title             |
+---------+--------+--------+-------------------+
|    1234 | Nandhi |   2015 | Data Structures   |
|    1235 | Nandhi |   2010 | Computer Networs  |
|    1236 | Sudha  |   2011 | Computer Graphics |
|    1237 | Star   |   2015 | Network Security  |
+---------+--------+--------+-------------------+
4 rows in set (0.00 sec)
```

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

```
mysql> create view v_publication as
    -> select book_id, title, P_year
    -> from book
    -> order by P_year;
Query OK, 0 rows affected (0.11 sec)

mysql> select * from v_publication;
+---------+--------------------+--------+
| book_id | title              | P_year |
+---------+--------------------+--------+
|    1235 | Computer Networs   |   2010 |
|    1236 | Computer Graphics  |   2011 |
|    1234 | Data Structures    |   2015 |
|    1237 | Network Security   |   2015 |
+---------+--------------------+--------+
4 rows in set (0.09 sec)
```

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

```
mysql> create view book_view as
    -> select book_id, title, branch_id, no_of_copies
    -> from book natural join book_copies;
Query OK, 0 rows affected (0.08 sec)

mysql> select * from book_view;
+---------+-------------------+-----------+--------------+
| book_id | title             | branch_id | no_of_copies |
+---------+-------------------+-----------+--------------+
|    1234 | Data Structures   |       201 |           15 |
|    1234 | Data Structures   |       202 |           10 |
|    1235 | Computer Networs  |       203 |           13 |
|    1235 | Computer Networs  |       206 |           10 |
|    1236 | Computer Graphics |       202 |            7 |
|    1236 | Computer Graphics |       205 |           11 |
|    1237 | Network Security  |       205 |            8 |
+---------+-------------------+-----------+--------------+
```

- Query 5: Create a view of all books and its number of copies that are currently available in the Library (alternate solution)

```
mysql> create view v_book as
    -> select book_id, title, sum(no_of_copies) copies_available
    -> from book natural join book_copies
    -> group by book_id, title;
Query OK, 0 rows affected (0.08 sec)

mysql> select * from v_book;
+---------+-------------------+------------------+
| book_id | title             | copies_available |
+---------+-------------------+------------------+
|    1234 | Data Structures   |               25 |
|    1235 | Computer Networs  |               23 |
|    1236 | Computer Graphics |               18 |
|    1237 | Network Security  |                8 |
+---------+-------------------+------------------+
4 rows in set (0.00 sec)
```