

LIBRARY MANAGEMENT SYSTEM

Final Project for SQL Module

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1. Description:

Following database schema is designed to function as a backend storage database for a web application built to manage a library.

By storing information in a relational database, all the tasks related to daily functioning of the library can be performed easily and much more efficiently. Some of the benefits of using this system to store data over traditional paper registers are as follows:

- Updating and modifying booklist in the library is much easier and efficient
- Maintaining customer details and their account is easy and efficient.
- Calculations like due payments can be done automatically by DBMS, thus eliminating human error
- RDBMS provides many ways to analyze available data, thus helping in making more informed decisions about inventory management and other aspects of library management

This database contains 5 tables:

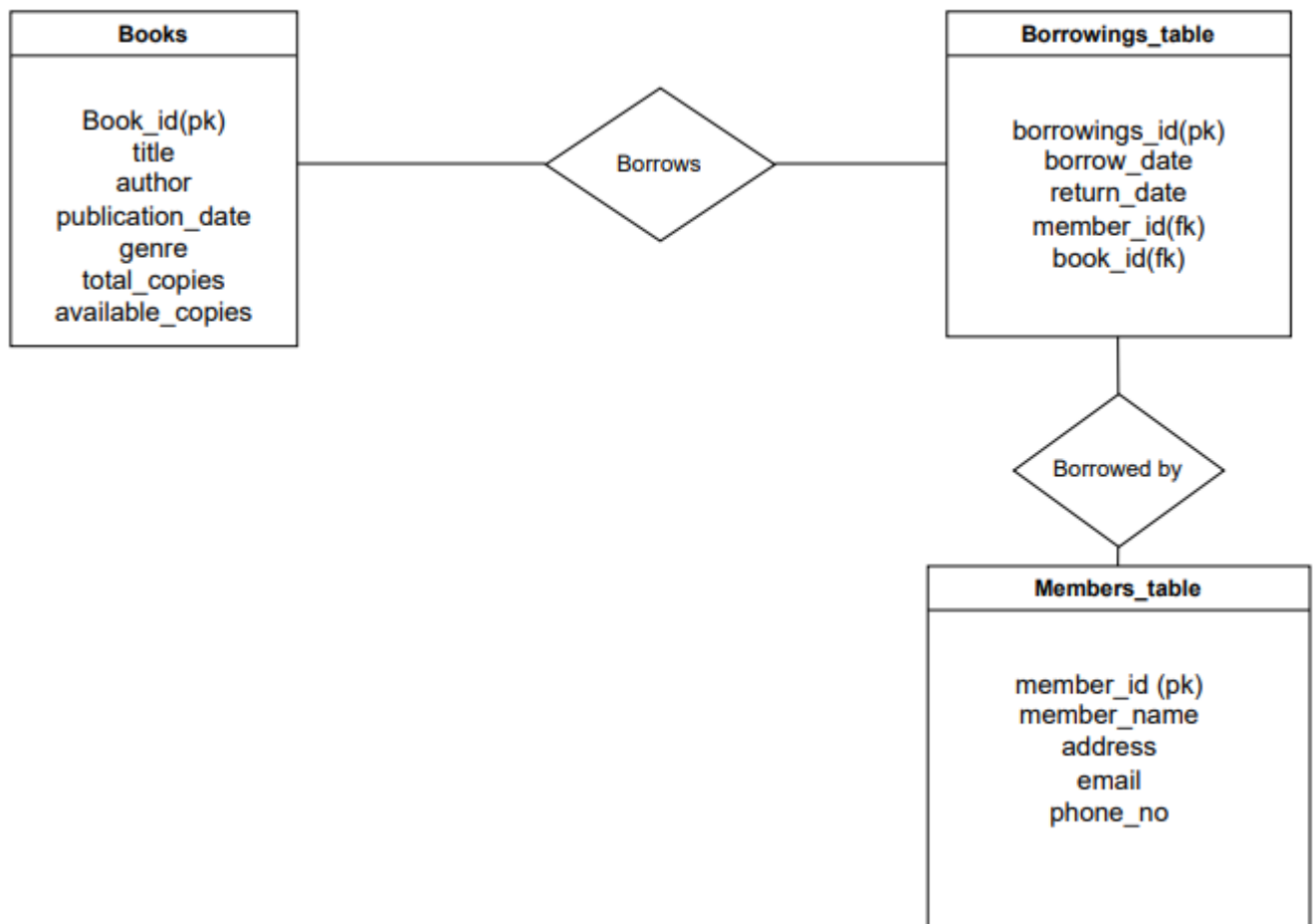
1. books
2. members_table
3. borrowings_table

How these tables/entities are related to each other is shown pictorially on next page through ER diagram, i.e., Entity Relationship Diagram.

Library Management
System

ER Diagram

2. ER-Diagram for Library Management System:



3. Table Descriptions:

1. books:

MariaDB [library]> desc books;

Field	Type	Null	Key	Default	Extra
book_id	int(11)	NO	PRI	NULL	
title	varchar(200)	YES		NULL	
author	varchar(200)	YES		NULL	
publication_date	date	YES		NULL	
genre	varchar(200)	YES		NULL	
total_copies	int(11)	YES		NULL	
available_copies	int(11)	YES		NULL	

7 rows in set (0.014 sec)

2. members table:

MariaDB [library]> desc members_table;

Field	Type	Null	Key	Default	Extra
member_id	int(11)	NO	PRI	NULL	
member_name	varchar(200)	YES		NULL	
address	varchar(200)	YES		NULL	
email	varchar(100)	YES		NULL	
phone_no	bigint(20)	YES		NULL	

5 rows in set (0.013 sec)

3.borrowings_table:

MariaDB [library]> desc borrowings_table;

Field	Type	Null	Key	Default	Extra
borrowings_id	int(11)	NO	PRI	NULL	
borrow_date	date	YES		NULL	
return_date	date	YES		NULL	
member_id	int(11)	YES	MUL	NULL	
book_id	int(11)	YES	MUL	NULL	

5 rows in set (0.014 sec)

4. Commands:

- **Create Database:**

```
CREATE DATABASE library;
```

- **Select Database:**

```
USE library;
```

- **Create table named books:**

```
create TABLE books  
(book_id int PRIMARY key  
,title varchar(200),author  
varchar(200),publication_da  
te date,genre  
varchar(200),total_copies  
int ,available_copies int );
```

- **Create table named
members_table:**

```
create TABLE  
Members_table  
(member_id int PRIMARY  
key ,member_name  
varchar(200),address  
varchar(200),email  
varchar(100),phone_no  
BIGINT);
```

- **Create table named borrowings_table:**

```
create TABLE Borrowings_table (borrowings_id int PRIMARY key ,borrow_date date  
,return_date date,  
member_id int,  
book_id int,  
FOREIGN key (member_id) REFERENCES Members_table(member_id),  
FOREIGN key (book_id) REFERENCES books(book_id));
```

- **Populate “books” table:**

```
INSERT INTO books VALUES
(1, 'A Daughter of the
Snows', 'federic', '2012-5-
23', 'drama', 10, 5),
(2, 'The Near East: 10,000
Years of
History', 'jhon', '2015-3-
8', 'adventure', 15, 8),
(3, 'The Cocoon: A Rest-Cure
Comedy', 'whick', '2016-8-
9', 'comedy', 8, 3),
(4, 'The Freakshow
Murders', 'tony', '2020-2-
8', 'crime', 13, 5),
(5, 'Pharaohs, Fellahs and
Explorers', 'roger', '2015-2-
6', 'sci-fi', 17, 8),
(6, 'Hard Times', 'linda', '2013-
8-1', 'biography', 5, 2),
(7, 'A Modern
Instance', 'christopher', '2021-
5-6', 'sci-fi', 8, 1),
(8, 'The Real Mother
Goose', 'aiman', '2015-5-
8', 'action', 5, 1),
(9, 'A Thousand Miles Up the
Nile', 'banner', '2017-2-
3', 'drama', 8, 2),
(10, 'Children of Blood and
Bone', 'wanda', '2019-5-
7', 'crime', 5, 3);
```

- **Populate
“members_table” table:**

```
INSERT into
members_table VALUES
```

```
(1, 'peter', 'ahmedabad', 'p
eter@gmail.com', 321654
9870),
(2, 'henry', 'luckhnow', 'hen
ry@gmail.com', 32165498
454),
(3, 'aiman', 'mumbai', 'aima
n@gmail.com', 32165487
870),
(4, 'ansari', 'delhi', 'ansari@
```

```
gmail.com',32165787870)
,
(5,'william','punjab','william@gmail.com',3216569870),
(6,'virat','chennai','virat@gmail.com',312654156140),
(7,'kohli','kashmir','kohli@gmail.com',3212549870),
(8,'narendra','gujrat','narendra@gmail.com',3216541270),
(9,'modi','rajkot','modi@gmail.com',3212349870),
(10,'shinde','mumbai','shinde@gmail.com',3299549870);
```

- **Populate “borrowings” table:**
INSERT INTO borrowings VALUES

```
(1,'2022-8-9','2022-8-15',2,3),
(2,'2022-7-5','2022-7-27',5,9),
(3,'2023-1-9','2023-8-15',7,2),
(4,'2021-5-23','2021-6-15',3,1),
(5,'2022-5-1','2022-5-18',6,8),
(6,'2023-4-7','2023-5-10',5,3),
(7,'2021-1-9','2021-1-21',10,7),
(8,'2016-9-9','2016-10-15',4,9),
(9,'2020-12-12','2020-12-15',7,10),
(10,'2023-4-9','2023-6-19',8,9);
```

5. All queries:

-----> showing all tables

1) books

```
MariaDB [library]> select * from books;
```

book_id	title	author	publication_date	genre	total_copies	available_copies
1	A Daughter of the Snows	federic	2012-05-23	drama	10	5
2	The Near East: 10,000 Years of History	jhon	2015-03-08	adventure	15	8
3	The Cocoon: A Rest-Cure Comedy	whick	2016-08-09	comedy	8	3
4	The Freakshow Murders	tony	2020-02-08	crime	13	5
5	Pharaohs, Fellahs and Explorers	roger	2015-02-06	sci_fi	17	8
6	Hard Times	linda	2013-08-01	biography	5	2
7	A Modern Instance	christopher	2021-05-06	sci_fi	8	1
8	The Real Mother Goose	aiman	2015-05-08	action	5	1
9	A Thousand Miles Up the Nile	banner	2017-02-03	drama	8	2
10	Children of Blood and Bone	wanda	2019-05-07	crime	5	3

10 rows in set (0.000 sec)

2)members_table

```
MariaDB [library]> select * from members_table;
```

member_id	member_name	location	email	phone_no
1	emiway_bantai	ahmedabad	peter@gmail.com	3216549870
2	henry	lucknow	henry@gmail.com	32165498454
3	aiman	mumbai	aiman@gmail.com	32165487870
4	ansari	delhi	ansari@gmail.com	32165787870
5	william	punjab	william@gmail.com	3216569870
6	virat	chennai	virat@gmail.com	312654156140
7	kohli	kashmir	kohli@gmail.com	3212549870
8	narendra	gujrat	narendra@gmail.com	3216541270
9	modi	rajkot	modi@gmail.com	3212349870
10	shinde	mumbai	shinde@gmail.com	3299549870

10 rows in set (0.000 sec)

3) borrowings_table

```
MariaDB [library]> select * from borrowings_table;
```

borrowings_id	borrow_date	return_date	member_id	book_id
1	2022-08-09	2022-08-15	2	3
2	2022-07-05	2022-07-27	5	9
3	2023-01-09	2023-08-15	7	2
4	2021-05-23	2021-06-15	3	1
5	2022-05-01	2022-05-18	6	8
6	2023-04-07	2023-05-10	5	3
7	2021-01-09	2021-01-21	10	7
8	2016-09-09	2016-10-15	4	9
9	2020-12-12	2020-12-15	7	10
10	2023-04-09	2023-06-19	8	9

```
10 rows in set (0.000 sec)
```

-----> alter table and add column

```
MariaDB [library]> alter table members_table
MariaDB [library]> alter table members_table
-> add column age int after location;
Query OK, 0 rows affected (0.051 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [library]> select * from members_table;
```

member_id	member_name	location	age	email	phone_no
1	emiway_bantai	ahmedabad	NULL	peter@gmail.com	3216549870
2	henry	lucknow	NULL	henry@gmail.com	32165498454
3	aiman	mumbai	NULL	aiman@gmail.com	32165487870
4	ansari	delhi	NULL	ansari@gmail.com	32165787870
5	william	punjab	NULL	william@gmail.com	3216569870
6	virat	chennai	NULL	virat@gmail.com	312654156140
7	kohli	kashmir	NULL	kohli@gmail.com	3212549870
8	narendra	gujrat	NULL	narendra@gmail.com	3216541270
9	modi	rajkot	NULL	modi@gmail.com	3212349870
10	shinde	mumbai	NULL	shinde@gmail.com	3299549870

```
10 rows in set (0.000 sec)
```


-----> Drop column

```
MariaDB [library]> alter table members_table
```

```
-> drop age;
```

```
Query OK, 0 rows affected (0.091 sec)
```

```
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [library]> select * from members_table;
```

member_id	member_name	location	email	phone_no
1	emiway_bantai	ahmedabad	peter@gmail.com	3216549870
2	henry	luckhnow	henry@gmail.com	32165498454
3	aiman	mumbai	aiman@gmail.com	32165487870
4	ansari	delhi	ansari@gmail.com	32165787870
5	william	punjab	william@gmail.com	3216569870
6	virat	chennai	virat@gmail.com	312654156140
7	kohli	kashmir	kohli@gmail.com	3212549870
8	narendra	gujrat	narendra@gmail.com	3216541270
9	modi	rajkot	modi@gmail.com	3212349870
10	shinde	mumbai	shinde@gmail.com	3299549870

10 rows in set (0.000 sec)

-----> update table

```
MariaDB [library]> update members_table
```

```
MariaDB [library]> update members_table
```

```
-> set member_name='divine'
```

```
-> where member_id=2;
```

```
Query OK, 1 row affected (0.041 sec)
```

```
Rows matched: 1 Changed: 1 Warnings: 0
```

```
MariaDB [library]> select * from members_table;
```

member_id	member_name	location	email	phone_no
1	emiway_bantai	ahmedabad	peter@gmail.com	3216549870
2	divine	luckhnow	henry@gmail.com	32165498454
3	aiman	mumbai	aiman@gmail.com	32165487870
4	ansari	delhi	ansari@gmail.com	32165787870
5	william	punjab	william@gmail.com	3216569870
6	virat	chennai	virat@gmail.com	312654156140
7	kohli	kashmir	kohli@gmail.com	3212549870
8	narendra	gujrat	narendra@gmail.com	3216541270
9	modi	rajkot	modi@gmail.com	3212349870
10	shinde	mumbai	shinde@gmail.com	3299549870

10 rows in set (0.000 sec)

-----> changing column name

```
MariaDB [library]> alter table members_table
-> change column location address varchar(100);
Query OK, 0 rows affected (0.068 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [library]> select * from members_table;
+-----+-----+-----+-----+-----+
| member_id | member_name | address | email | phone_no |
+-----+-----+-----+-----+-----+
| 1 | emiway_bantai | ahmedabad | peter@gmail.com | 3216549870 |
| 2 | divine | luckhnow | henry@gmail.com | 32165498454 |
| 3 | aiman | mumbai | aiman@gmail.com | 32165487870 |
| 4 | ansari | delhi | ansari@gmail.com | 32165787870 |
| 5 | william | punjab | william@gmail.com | 3216569870 |
| 6 | virat | chennai | virat@gmail.com | 312654156140 |
| 7 | kohli | kashmir | kohli@gmail.com | 3212549870 |
| 8 | narendra | gujrat | narendra@gmail.com | 3216541270 |
| 9 | modi | rajkot | modi@gmail.com | 3212349870 |
| 10 | shinde | mumbai | shinde@gmail.com | 3299549870 |
+-----+-----+-----+-----+-----+
10 rows in set (0.000 sec)
```

-----> equal to operator(=)

```
MariaDB [library]> select title from books
-> where author='federic';
+-----+
| title |
+-----+
| A Daughter of the Snows |
+-----+
1 row in set (0.000 sec)
```

-----> AND operator

```
MariaDB [library]> select * from members_table
-> where member_id='1'
-> and
-> address='ahmedabad';
+-----+-----+-----+-----+-----+
| member_id | member_name | address | email | phone_no |
+-----+-----+-----+-----+-----+
| 1 | emiway_bantai | ahmedabad | peter@gmail.com | 3216549870 |
+-----+-----+-----+-----+-----+
1 row in set (0.000 sec)
```

-----> OR operator

```

MariaDB [library]> select * from members_table
MariaDB [library]> select * from members_table
  -> where member_id='1'
  -> or
  -> address='mumbai';
+-----+-----+-----+-----+-----+
| member_id | member_name | address | email | phone_no |
+-----+-----+-----+-----+-----+
|          1 | emiway_bantai | ahmedabad | peter@gmail.com | 3216549870 |
|          3 | aiman | mumbai | aiman@gmail.com | 32165487870 |
|         10 | shinde | mumbai | shinde@gmail.com | 3299549870 |
+-----+-----+-----+-----+-----+
3 rows in set (0.000 sec)

```

-----> IN

```

MariaDB [library]> select * from members_table
  -> where address in('delhi','rajkot');
+-----+-----+-----+-----+-----+
| member_id | member_name | address | email | phone_no |
+-----+-----+-----+-----+-----+
|          4 | ansari | delhi | ansari@gmail.com | 32165787870 |
|          9 | modi | rajkot | modi@gmail.com | 3212349870 |
+-----+-----+-----+-----+-----+
2 rows in set (0.000 sec)

```

-----> NOT IN

```

MariaDB [library]> select * from members_table
  -> where address not in('delhi','rajkot');
+-----+-----+-----+-----+-----+
| member_id | member_name | address | email | phone_no |
+-----+-----+-----+-----+-----+
|          1 | emiway_bantai | ahmedabad | peter@gmail.com | 3216549870 |
|          2 | divine | luckhnow | henry@gmail.com | 32165498454 |
|          3 | aiman | mumbai | aiman@gmail.com | 32165487870 |
|          5 | william | punjab | william@gmail.com | 3216569870 |
|          6 | virat | chennai | virat@gmail.com | 312654156140 |
|          7 | kohli | kashmir | kohli@gmail.com | 3212549870 |
|          8 | narendra | gujrat | narendra@gmail.com | 3216541270 |
|         10 | shinde | mumbai | shinde@gmail.com | 3299549870 |
+-----+-----+-----+-----+-----+
8 rows in set (0.000 sec)

```

-----> between

```
MariaDB [library]> select * from members_table
-> where member_id
-> between 2 and 5;
```

member_id	member_name	address	email	phone_no
2	divine	luckhnow	henry@gmail.com	32165498454
3	aiman	mumbai	aiman@gmail.com	32165487870
4	ansari	delhi	ansari@gmail.com	32165787870
5	william	punjab	william@gmail.com	3216569870

4 rows in set (0.010 sec)

----->limit

```
MariaDB [library]> select * from members_table
-> limit 3;
```

member_id	member_name	address	email	phone_no
1	emiway_bantai	ahmedabad	peter@gmail.com	3216549870
2	divine	luckhnow	henry@gmail.com	32165498454
3	aiman	mumbai	aiman@gmail.com	32165487870

3 rows in set (0.000 sec)

-----> order by

```
MariaDB [library]> select * from members_table
-> order by member_id desc;
```

member_id	member_name	address	email	phone_no
10	shinde	mumbai	shinde@gmail.com	3299549870
9	modi	rajkot	modi@gmail.com	3212349870
8	narendra	gujrat	narendra@gmail.com	3216541270
7	kohli	kashmir	kohli@gmail.com	3212549870
6	virat	chennai	virat@gmail.com	312654156140
5	william	punjab	william@gmail.com	3216569870
4	ansari	delhi	ansari@gmail.com	32165787870
3	aiman	mumbai	aiman@gmail.com	32165487870
2	divine	luckhnow	henry@gmail.com	32165498454
1	emiway_bantai	ahmedabad	peter@gmail.com	3216549870

10 rows in set (0.000 sec)

-----> like

```
MariaDB [library]> select * from members_table
-> where member_name
->    like 'a%';
```

member_id	member_name	address	email	phone_no
3	aiman	mumbai	aiman@gmail.com	32165487870
4	ansari	delhi	ansari@gmail.com	32165787870

2 rows in set (0.000 sec)

-----> string functions

1)upper case

```
MariaDB [library]> select upper(member_name) as upper_case from members_table;
MariaDB [library]> select upper(member_name) as upper_case from members_table;
```

upper_case
EMIWAY_BANTAI
DIVINE
AIMAN
ANSARI
WILLIAM
VIRAT
KOHLI
NARENDRA
MODI
SHINDE

10 rows in set (0.000 sec)

2)Concat

```
MariaDB [library]> select concat(member_name,'',email) from members_table;
+-----+
| concat(member_name,'',email) |
+-----+
| emiway_bantaipeter@gmail.com |
| divinehenry@gmail.com        |
| aimanaiman@gmail.com         |
| ansariansari@gmail.com       |
| williamwilliam@gmail.com     |
| viratvirat@gmail.com         |
| kohlikohli@gmail.com         |
| narendranarendra@gmail.com   |
| modimodi@gmail.com           |
| shindeshinde@gmail.com       |
+-----+
10 rows in set (0.013 sec)
```

3)length

```
MariaDB [library]> select length(member_name) from members_table;
MariaDB [library]> select length(member_name) from members_table;
+-----+
| length(member_name) |
+-----+
| 13 |
| 6 |
| 5 |
| 6 |
| 7 |
| 5 |
| 5 |
| 8 |
| 4 |
| 6 |
+-----+
10 rows in set (0.000 sec)
```

4)reverse

```
MariaDB [library]> select reverse(member_name) from members_table;
+-----+
| reverse(member_name) |
+-----+
| iatnab_yawime        |
| enivid               |
| namia                |
| irasna               |
| mailliw              |
| tariv                |
| ilhok                |
| ardneran             |
| idom                 |
| ednihs               |
+-----+
10 rows in set (0.000 sec)
```

-----> aggregate functions

1)count()

```
MariaDB [library]> select count(*) from members_table;
+-----+
| count(*) |
+-----+
|         10 |
+-----+
1 row in set (0.000 sec)
```

2)min(),max()

```
MariaDB [library]> select min(member_id) from members_table;
+-----+
| min(member_id) |
+-----+
|                1 |
+-----+
1 row in set (0.013 sec)

MariaDB [library]> select max(member_id) from members_table;
+-----+
| max(member_id) |
+-----+
|                10 |
+-----+
1 row in set (0.000 sec)
```

3)sum()

```
MariaDB [library]> select sum(member_id) from members_table;
+-----+
| sum(member_id) |
+-----+
|          55 |
+-----+
1 row in set (0.016 sec)
```

-----> group by

```
MariaDB [library]> select genre,count(genre) from books
->      group by genre;
+-----+-----+
| genre | count(genre) |
+-----+-----+
| action |          1 |
| adventure |          1 |
| biography |          1 |
| comedy |          1 |
| crime |          2 |
| drama |          2 |
| sci-fi |          2 |
+-----+-----+
7 rows in set (0.001 sec)
```

-----> having

```
MariaDB [library]> select genre,count(genre) from books
->      group by genre having genre='drama';
+-----+-----+
| genre | count(genre) |
+-----+-----+
| drama |          2 |
+-----+-----+
1 row in set (0.000 sec)
```


-----> display list of books issued by members

```
MariaDB [library]> select m.member_name,b.title from members_table M
-> inner join books b
-> on m.member_id=b.book_id;
```

member_name	title
emiway_bantai	A Daughter of the Snows
divine	The Near East: 10,000 Years of History
aiman	The Cocoon: A Rest-Cure Comedy
ansari	The Freakshow Murders
william	Pharaohs, Fellahs and Explorers
virat	Hard Times
kohli	A Modern Instance
narendra	The Real Mother Goose
modi	A Thousand Miles Up the Nile
shinde	Children of Blood and Bone

10 rows in set (0.006 sec)

-----> sub queries(to display the oldest book)

```
MariaDB [library]> select title,publication_date,author from books
-> where publication_date=(select min(Publication_date)from books);
```

title	publication_date	author
A Daughter of the Snows	2012-05-23	federic

1 row in set (0.007 sec)

-----> sub queries(to display the newest book)

```
MariaDB [library]> select title,publication_date,author from books
-> where publication_date=(select max(Publication_date)from books);
```

title	publication_date	author
A Modern Instance	2021-05-06	christopher

1 row in set (0.000 sec)

