Assignment 5

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RollNo: 20CS8024

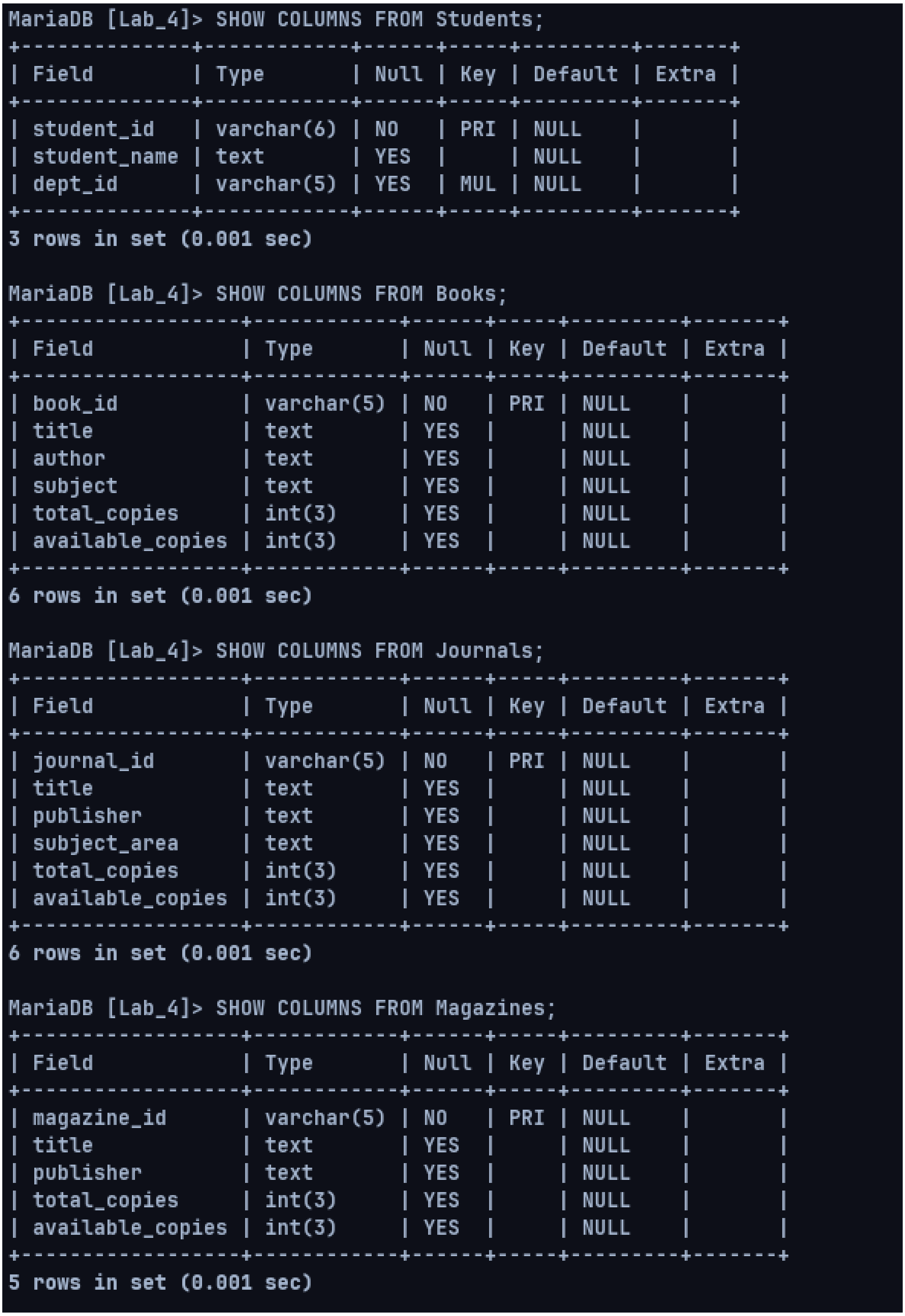
Question: Library information system:

Database should store information about books, journals, megazines etc. Searching for books can be done by author, title, subject. Similarly journals can be searched by subject area, publisher etc. It should also be possible to see which book is issued to which student and belonging department. Create the tables having appropriate referential integrity constraints. Make and state assumptions, if any. Write and run the following SQL queries on the tables:

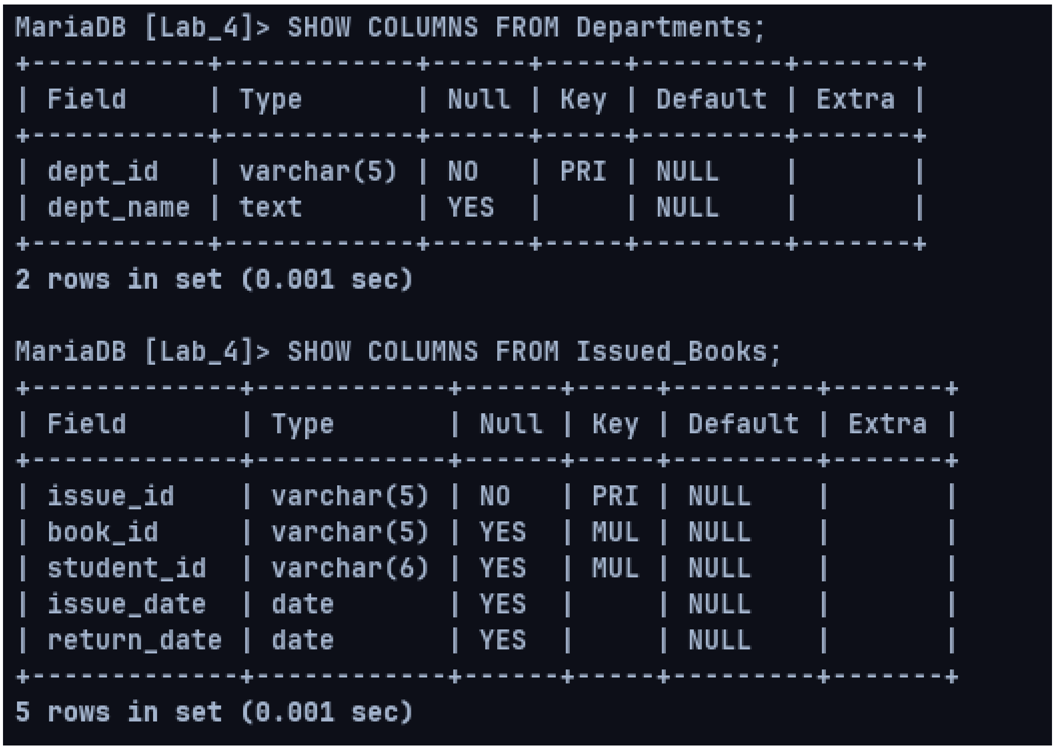
1. List the names of the books issued between 21-aug-08 and 29-Aug-08.
2. Retrieve the name and number of books by a particular author.
3. Retrieve the name of the publisher which has maximum number of books.
4. Count the total number of books in the library.
5. Count the number of books issued to a student with Roll no 'CSB06001'
6. Change the author of the book to 'ABC' with book id='BK003'.
7. Retrieve the name of the student to whom the book named 'Database System', 'E.Navathe' is issued.
8. Display the total number of books issued to different departments.
9. List the name of the books where subject is like 'ora'.

Solution

```
CREATE TABLE Books (
    book_id varchar(5) PRIMARY KEY,
    title TEXT,
    author TEXT,
    subject TEXT,
    total_copies INT(3),
    available_copies INT(3)
);

CREATE TABLE Journals (
    journal_id varchar(5) PRIMARY KEY,
    title TEXT,
    publisher TEXT,
    subject_area TEXT,
    total_copies INT(3),
    available_copies INT(3)
);

CREATE TABLE Magazines (
    magazine_id varchar(5) PRIMARY KEY,
    title TEXT,
    publisher TEXT,
    total_copies INT(3),
    available_copies INT(3)
);

CREATE TABLE Departments (
    dept_id VARCHAR(5) PRIMARY KEY,
    dept_name TEXT
);

CREATE TABLE Students (
    student_id varchar(10) PRIMARY KEY,
    student_name TEXT,
    dept_id VARCHAR(5),
    FOREIGN KEY (dept_id) REFERENCES Departments(dept_id)
);

CREATE TABLE Issued_Books (
    issue_id VARCHAR(5) PRIMARY KEY,
    book_id VARCHAR(5),
    student_id VARCHAR(6),
    issue_date DATE,
    return_date DATE,
    FOREIGN KEY (book_id) REFERENCES Books(book_id),
    FOREIGN KEY (student_id) REFERENCES Students(student_id)
);
```

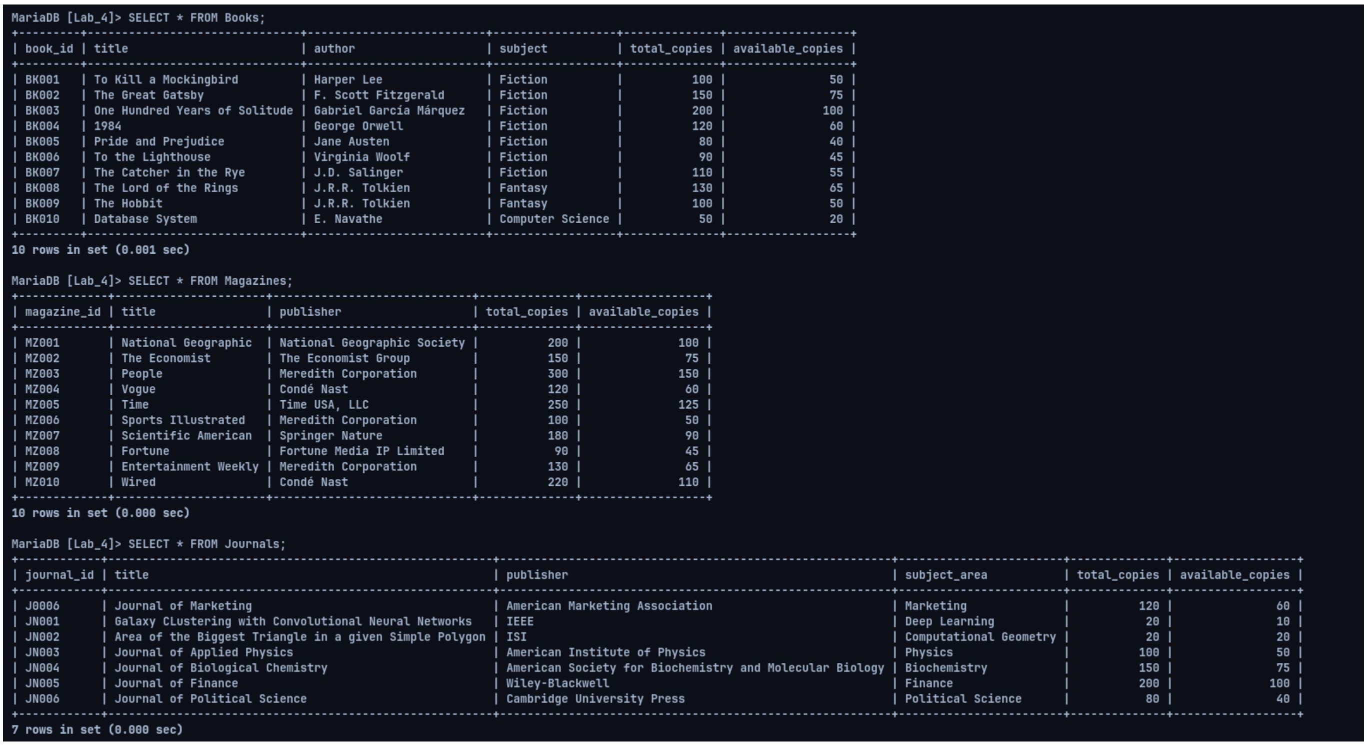


```
MariaDB [Lab_4]> SHOW COLUMNS FROM Students;
+--------------+------------+------+-----+---------+-------+
| Field        | Type       | Null | Key | Default | Extra |
+--------------+------------+------+-----+---------+-------+
| student_id   | varchar(6) | NO   | PRI | NULL    |       |
| student_name | text       | YES  |     | NULL    |       |
| dept_id      | varchar(5) | YES  | MUL | NULL    |       |
+--------------+------------+------+-----+---------+-------+
3 rows in set (0.001 sec)

MariaDB [Lab_4]> SHOW COLUMNS FROM Books;
+------------------+------------+------+-----+---------+-------+
| Field            | Type       | Null | Key | Default | Extra |
+------------------+------------+------+-----+---------+-------+
| book_id          | varchar(5) | NO   | PRI | NULL    |       |
| title            | text       | YES  |     | NULL    |       |
| author           | text       | YES  |     | NULL    |       |
| subject          | text       | YES  |     | NULL    |       |
| total_copies     | int(3)     | YES  |     | NULL    |       |
| available_copies | int(3)     | YES  |     | NULL    |       |
+------------------+------------+------+-----+---------+-------+
6 rows in set (0.001 sec)

MariaDB [Lab_4]> SHOW COLUMNS FROM Journals;
+------------------+------------+------+-----+---------+-------+
| Field            | Type       | Null | Key | Default | Extra |
+------------------+------------+------+-----+---------+-------+
| journal_id       | varchar(5) | NO   | PRI | NULL    |       |
| title            | text       | YES  |     | NULL    |       |
| publisher        | text       | YES  |     | NULL    |       |
| subject_area     | text       | YES  |     | NULL    |       |
| total_copies     | int(3)     | YES  |     | NULL    |       |
| available_copies | int(3)     | YES  |     | NULL    |       |
+------------------+------------+------+-----+---------+-------+
6 rows in set (0.001 sec)

MariaDB [Lab_4]> SHOW COLUMNS FROM Magazines;
+------------------+------------+------+-----+---------+-------+
| Field            | Type       | Null | Key | Default | Extra |
+------------------+------------+------+-----+---------+-------+
| magazine_id      | varchar(5) | NO   | PRI | NULL    |       |
| title            | text       | YES  |     | NULL    |       |
| publisher        | text       | YES  |     | NULL    |       |
| total_copies     | int(3)     | YES  |     | NULL    |       |
| available_copies | int(3)     | YES  |     | NULL    |       |
+------------------+------------+------+-----+---------+-------+
5 rows in set (0.001 sec)
```

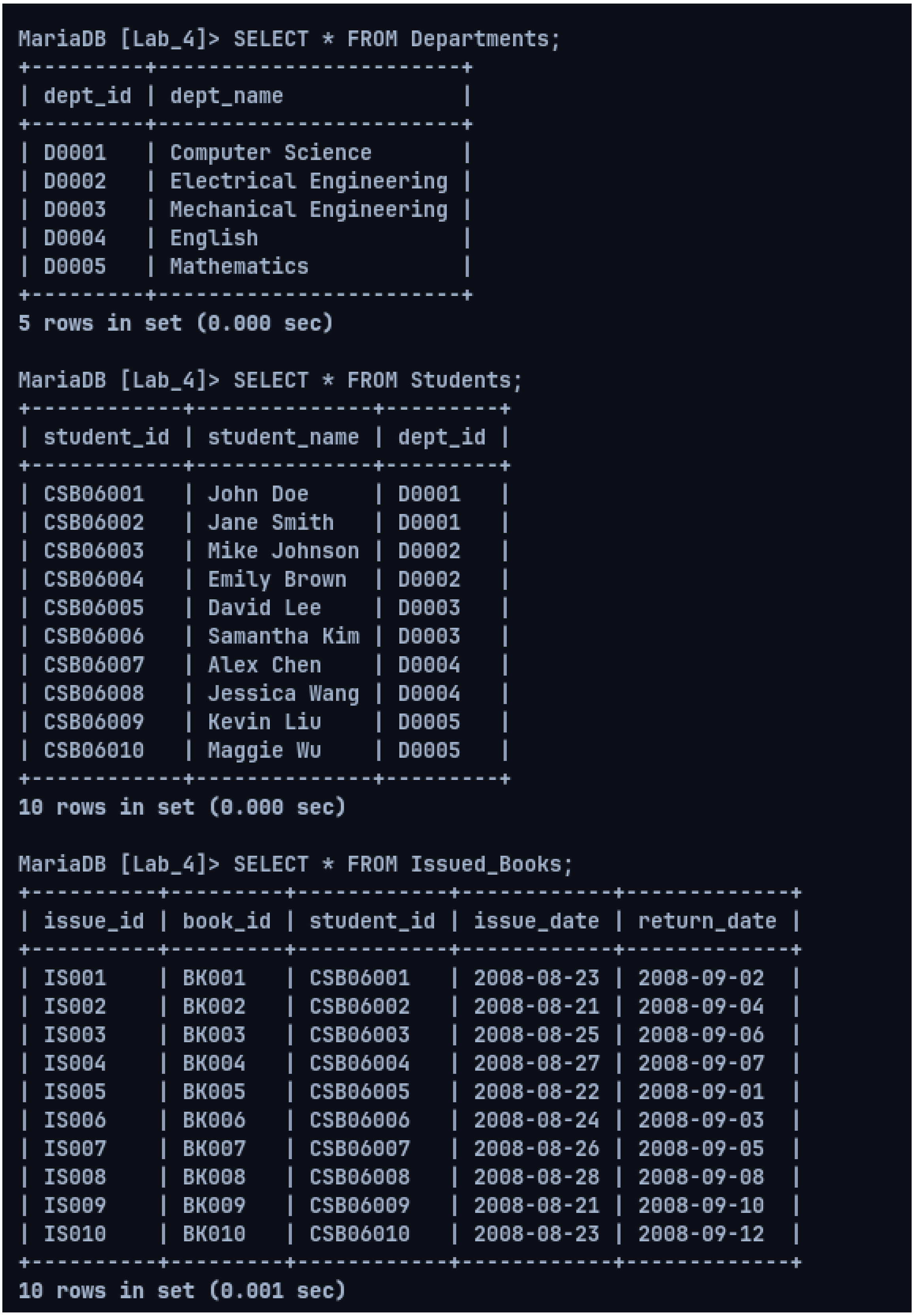


```
MariaDB [Lab_4]> SHOW COLUMNS FROM Departments;
+-----------+------------+------+-----+---------+-------+
| Field     | Type       | Null | Key | Default | Extra |
+-----------+------------+------+-----+---------+-------+
| dept_id   | varchar(5) | NO   | PRI | NULL    |       |
| dept_name | text       | YES  |     | NULL    |       |
+-----------+------------+------+-----+---------+-------+
2 rows in set (0.001 sec)

MariaDB [Lab_4]> SHOW COLUMNS FROM Issued_Books;
+-------------+------------+------+-----+---------+-------+
| Field       | Type       | Null | Key | Default | Extra |
+-------------+------------+------+-----+---------+-------+
| issue_id    | varchar(5) | NO   | PRI | NULL    |       |
| book_id     | varchar(5) | YES  | MUL | NULL    |       |
| student_id  | varchar(6) | YES  | MUL | NULL    |       |
| issue_date  | date       | YES  |     | NULL    |       |
| return_date | date       | YES  |     | NULL    |       |
+-------------+------------+------+-----+---------+-------+
5 rows in set (0.001 sec)
```

```sql
INSERT INTO Books VALUES
('BK001', 'To Kill a Mockingbird', 'Harper Lee', 'Fiction', 100, 50),
('BK002', 'The Great Gatsby', 'F. Scott Fitzgerald', 'Fiction', 150, 75),
('BK003', 'One Hundred Years of Solitude', 'Gabriel García Márquez',
'Fiction', 200, 100),
('BK004', '1984', 'George Orwell', 'Fiction', 120, 60),
('BK005', 'Pride and Prejudice', 'Jane Austen', 'Fiction', 80, 40),
('BK006', 'To the Lighthouse', 'Virginia Woolf', 'Fiction', 90, 45),
('BK007', 'The Catcher in the Rye', 'J.D. Salinger', 'Fiction', 110, 55),
('BK008', 'The Lord of the Rings', 'J.R.R. Tolkien', 'Fantasy', 130, 65),
('BK009', 'The Hobbit', 'J.R.R. Tolkien', 'Fantasy', 100, 50),
('BK010', 'Database System', 'E. Navathe', 'Computer Science', 50, 20);

INSERT INTO Journals VALUES
("JN001", "Galaxy CLustering with Convolutional Neural Networks", "IEEE",
"Deep Learning", 20, 10),
("JN002", "Area of the Biggest Triangle in a given Simple Polygon", "ISI",
"Computational Geometry", 20, 20),
('JN003', 'Journal of Applied Physics', 'American Institute of Physics',
'Physics', 100, 50),
('JN004', 'Journal of Biological Chemistry', 'American Society for
Biochemistry and Molecular Biology', 'Biochemistry', 150, 75),
('JN005', 'Journal of Finance', 'Wiley-Blackwell', 'Finance', 200, 100),
('J0006', 'Journal of Marketing', 'American Marketing Association',
'Marketing', 120, 60),
('JN006', 'Journal of Political Science', 'Cambridge University Press',
'Political Science', 80, 40);

INSERT INTO Magazines VALUES
('MZ001', 'National Geographic', 'National Geographic Society', 200, 100),
('MZ002', 'The Economist', 'The Economist Group', 150, 75),
('MZ003', 'People', 'Meredith Corporation', 300, 150),
('MZ004', 'Vogue', 'Condé Nast', 120, 60),
('MZ005', 'Time', 'Time USA, LLC', 250, 125),
('MZ006', 'Sports Illustrated', 'Meredith Corporation', 100, 50),
('MZ007', 'Scientific American', 'Springer Nature', 180, 90),
('MZ008', 'Fortune', 'Fortune Media IP Limited', 90, 45),
('MZ009', 'Entertainment Weekly', 'Meredith Corporation', 130, 65),
('MZ010', 'Wired', 'Condé Nast', 220, 110);

INSERT INTO Departments VALUES
('D0001', 'Computer Science'),
('D0002', 'Electrical Engineering'),
('D0003', 'Mechanical Engineering'),
('D0004', 'English'),
('D0005', 'Mathematics');

INSERT INTO Students VALUES
('CSB06001', 'John Doe', 'D0001'),
('CSB06002', 'Jane Smith', 'D0001'),
('CSB06003', 'Mike Johnson', 'D0002'),
('CSB06004', 'Emily Brown', 'D0002'),
('CSB06005', 'David Lee', 'D0003'),
('CSB06006', 'Samantha Kim', 'D0003'),
('CSB06007', 'Alex Chen', 'D0004'),
('CSB06008', 'Jessica Wang', 'D0004'),
('CSB06009', 'Kevin Liu', 'D0005'),
('CSB06010', 'Maggie Wu', 'D0005');

INSERT INTO Issued_Books VALUES
    ('IS001', 'BK001', 'CSB06001', '2008-08-23', '2008-09-02'),
    ('IS002', 'BK002', 'CSB06002', '2008-08-21', '2008-09-04'),
    ('IS003', 'BK003', 'CSB06003', '2008-08-25', '2008-09-06'),
    ('IS004', 'BK004', 'CSB06004', '2008-08-27', '2008-09-07'),
    ('IS005', 'BK005', 'CSB06005', '2008-08-22', '2008-09-01'),
    ('IS006', 'BK006', 'CSB06006', '2008-08-24', '2008-09-03'),
    ('IS007', 'BK007', 'CSB06007', '2008-08-26', '2008-09-05'),
    ('IS008', 'BK008', 'CSB06008', '2008-08-28', '2008-09-08'),
    ('IS009', 'BK009', 'CSB06009', '2008-08-21', '2008-09-10'),
    ('IS010', 'BK010', 'CSB06010', '2008-08-23', '2008-09-12');
```



```
MariaDB [Lab_4]> SELECT * FROM Books;
+---------+-------------------------------+--------------------------+------------------+--------------+------------------+
| book_id | title                         | author                   | subject          | total_copies | available_copies |
+---------+-------------------------------+--------------------------+------------------+--------------+------------------+
| BK001   | To Kill a Mockingbird         | Harper Lee               | Fiction          |          100 |               50 |
| BK002   | The Great Gatsby              | F. Scott Fitzgerald      | Fiction          |          150 |               75 |
| BK003   | One Hundred Years of Solitude | Gabriel García Márquez   | Fiction          |          200 |              100 |
| BK004   | 1984                          | George Orwell            | Fiction          |          120 |               60 |
| BK005   | Pride and Prejudice           | Jane Austen              | Fiction          |           80 |               40 |
| BK006   | To the Lighthouse             | Virginia Woolf           | Fiction          |           90 |               45 |
| BK007   | The Catcher in the Rye        | J.D. Salinger            | Fiction          |          110 |               55 |
| BK008   | The Lord of the Rings         | J.R.R. Tolkien           | Fantasy          |          130 |               65 |
| BK009   | The Hobbit                    | J.R.R. Tolkien           | Fantasy          |          100 |               50 |
| BK010   | Database System               | E. Navathe               | Computer Science |           50 |               20 |
+---------+-------------------------------+--------------------------+------------------+--------------+------------------+
10 rows in set (0.001 sec)

MariaDB [Lab_4]> SELECT * FROM Magazines;
+-------------+----------------------+-----------------------------+--------------+------------------+
| magazine_id | title                | publisher                   | total_copies | available_copies |
+-------------+----------------------+-----------------------------+--------------+------------------+
| MZ001       | National Geographic  | National Geographic Society |          200 |              100 |
| MZ002       | The Economist        | The Economist Group         |          150 |               75 |
| MZ003       | People               | Meredith Corporation        |          300 |              150 |
| MZ004       | Vogue                | Condé Nast                  |          120 |               60 |
| MZ005       | Time                 | Time USA, LLC               |          250 |              125 |
| MZ006       | Sports Illustrated   | Meredith Corporation        |          100 |               50 |
| MZ007       | Scientific American  | Springer Nature             |          180 |               90 |
| MZ008       | Fortune              | Fortune Media IP Limited    |           90 |               45 |
| MZ009       | Entertainment Weekly | Meredith Corporation        |          130 |               65 |
| MZ010       | Wired                | Condé Nast                  |          220 |              110 |
+-------------+----------------------+-----------------------------+--------------+------------------+
10 rows in set (0.000 sec)

MariaDB [Lab_4]> SELECT * FROM Journals;
+------------+--------------------------------------------------------+---------------------------------------------------------+------------------------+--------------+------------------+
| journal_id | title                                                  | publisher                                               | subject_area           | total_copies | available_copies |
+------------+--------------------------------------------------------+---------------------------------------------------------+------------------------+--------------+------------------+
| J0006      | Journal of Marketing                                   | American Marketing Association                          | Marketing              |          120 |               60 |
| JN001      | Galaxy CLustering with Convolutional Neural Networks   | IEEE                                                    | Deep Learning          |           20 |               10 |
| JN002      | Area of the Biggest Triangle in a given Simple Polygon | ISI                                                     | Computational Geometry |           20 |               20 |
| JN003      | Journal of Applied Physics                             | American Institute of Physics                           | Physics                |          100 |               50 |
| JN004      | Journal of Biological Chemistry                        | American Society for Biochemistry and Molecular Biology | Biochemistry           |          150 |               75 |
| JN005      | Journal of Finance                                     | Wiley-Blackwell                                         | Finance                |          200 |              100 |
| JN006      | Journal of Political Science                           | Cambridge University Press                              | Political Science      |           80 |               40 |
+------------+--------------------------------------------------------+---------------------------------------------------------+------------------------+--------------+------------------+
7 rows in set (0.000 sec)
```

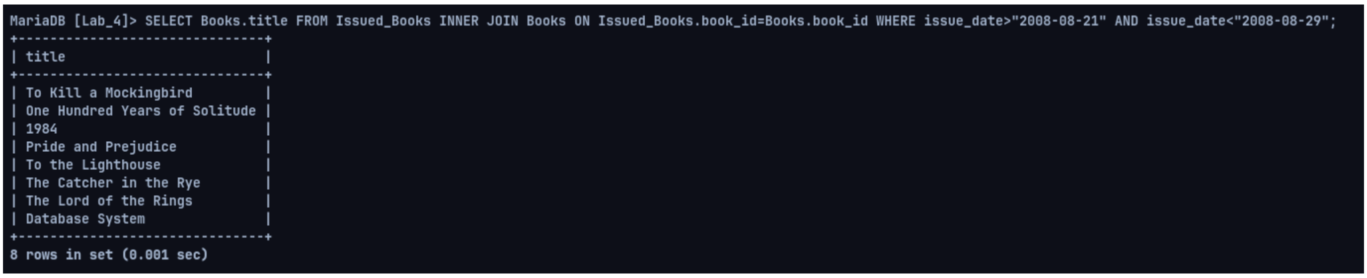


```
MariaDB [Lab_4]> SELECT * FROM Departments;
+---------+------------------------+
| dept_id | dept_name              |
+---------+------------------------+
| D0001   | Computer Science       |
| D0002   | Electrical Engineering |
| D0003   | Mechanical Engineering |
| D0004   | English                |
| D0005   | Mathematics            |
+---------+------------------------+
5 rows in set (0.000 sec)

MariaDB [Lab_4]> SELECT * FROM Students;
+------------+--------------+---------+
| student_id | student_name | dept_id |
+------------+--------------+---------+
| CSB06001   | John Doe     | D0001   |
| CSB06002   | Jane Smith   | D0001   |
| CSB06003   | Mike Johnson | D0002   |
| CSB06004   | Emily Brown  | D0002   |
| CSB06005   | David Lee    | D0003   |
| CSB06006   | Samantha Kim | D0003   |
| CSB06007   | Alex Chen    | D0004   |
| CSB06008   | Jessica Wang | D0004   |
| CSB06009   | Kevin Liu    | D0005   |
| CSB06010   | Maggie Wu    | D0005   |
+------------+--------------+---------+
10 rows in set (0.000 sec)

MariaDB [Lab_4]> SELECT * FROM Issued_Books;
+----------+---------+------------+------------+-------------+
| issue_id | book_id | student_id | issue_date | return_date |
+----------+---------+------------+------------+-------------+
| IS001    | BK001   | CSB06001   | 2008-08-23 | 2008-09-02  |
| IS002    | BK002   | CSB06002   | 2008-08-21 | 2008-09-04  |
| IS003    | BK003   | CSB06003   | 2008-08-25 | 2008-09-06  |
| IS004    | BK004   | CSB06004   | 2008-08-27 | 2008-09-07  |
| IS005    | BK005   | CSB06005   | 2008-08-22 | 2008-09-01  |
| IS006    | BK006   | CSB06006   | 2008-08-24 | 2008-09-03  |
| IS007    | BK007   | CSB06007   | 2008-08-26 | 2008-09-05  |
| IS008    | BK008   | CSB06008   | 2008-08-28 | 2008-09-08  |
| IS009    | BK009   | CSB06009   | 2008-08-21 | 2008-09-10  |
| IS010    | BK010   | CSB06010   | 2008-08-23 | 2008-09-12  |
+----------+---------+------------+------------+-------------+
10 rows in set (0.001 sec)
```

Queries

1. List the names of the books issued between 21-aug-08 and 29-Aug-08.

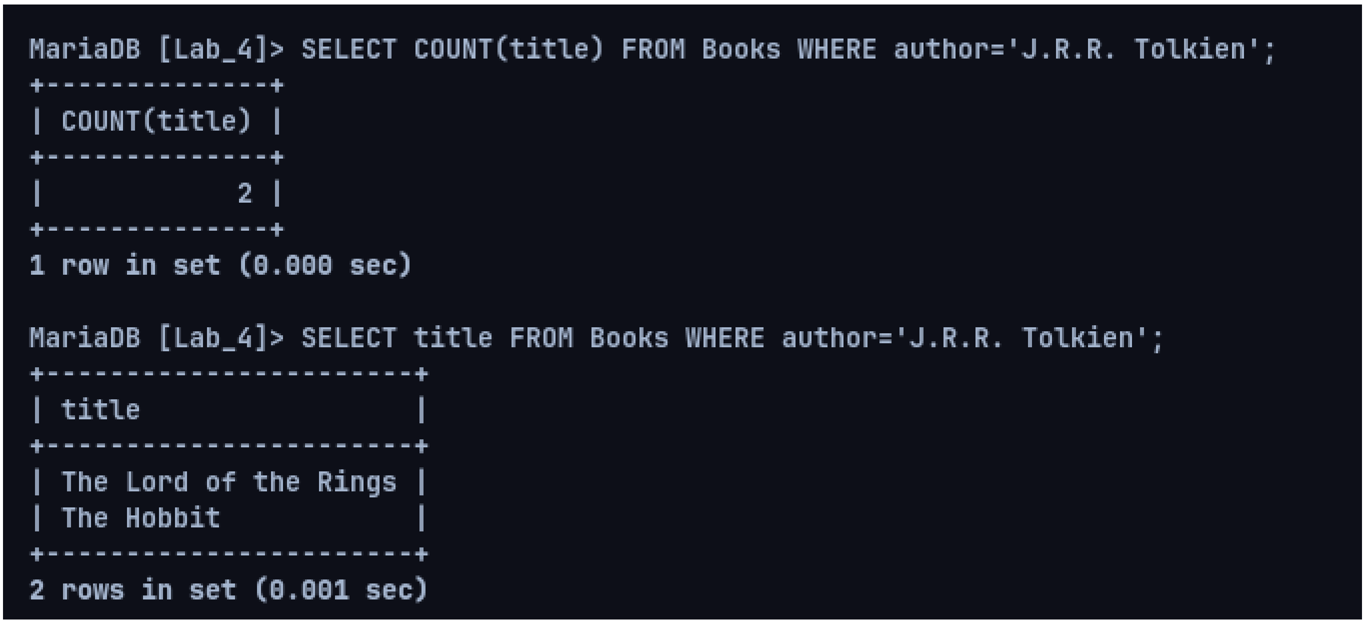
```
SELECT Books.title FROM Issued_Books INNER JOIN Books ON
Issued_Books.book_id=Books.book_id WHERE issue_date>"2008-08-21" AND
issue_date<"2008-08-29";
```



```
MariaDB [Lab_4]> SELECT Books.title FROM Issued_Books INNER JOIN Books ON Issued_Books.book_id=Books.book_id WHERE issue_date>"2008-08-21" AND issue_date<"2008-08-29";
+--------------------------------+
| title                          |
+--------------------------------+
| To Kill a Mockingbird          |
| One Hundred Years of Solitude  |
| 1984                           |
| Pride and Prejudice            |
| To the Lighthouse              |
| The Catcher in the Rye         |
| The Lord of the Rings          |
| Database System                |
+--------------------------------+
8 rows in set (0.001 sec)
```

2. Retrieve the name and number of books by a particular author.

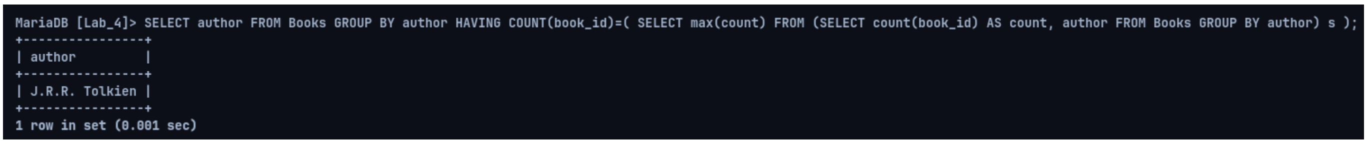
```
SELECT COUNT(title) FROM Books WHERE author='J.R.R. Tolkien';
SELECT title FROM Books WHERE author='J.R.R. Tolkien';
```



```
MariaDB [Lab_4]> SELECT COUNT(title) FROM Books WHERE author='J.R.R. Tolkien';
+--------------+
| COUNT(title) |
+--------------+
|            2 |
+--------------+
1 row in set (0.000 sec)

MariaDB [Lab_4]> SELECT title FROM Books WHERE author='J.R.R. Tolkien';
+-----------------------+
| title                 |
+-----------------------+
| The Lord of the Rings |
| The Hobbit            |
+-----------------------+
2 rows in set (0.001 sec)
```

3. Retrieve the name of the publisher which has maximum number of books.

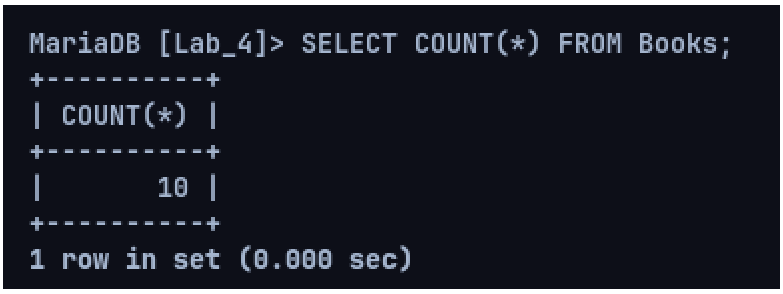
```
SELECT author FROM Books GROUP BY author HAVING COUNT(book_id)=( SELECT
max(count) FROM (SELECT count(book_id) AS count, author FROM Books GROUP BY
author) s );
```



```
MariaDB [Lab_4]> SELECT author FROM Books GROUP BY author HAVING COUNT(book_id)=( SELECT max(count) FROM (SELECT count(book_id) AS count, author FROM Books GROUP BY author) s );
+----------------+
| author         |
+----------------+
| J.R.R. Tolkien |
+----------------+
1 row in set (0.001 sec)
```

4. Count the total number of books in the library.

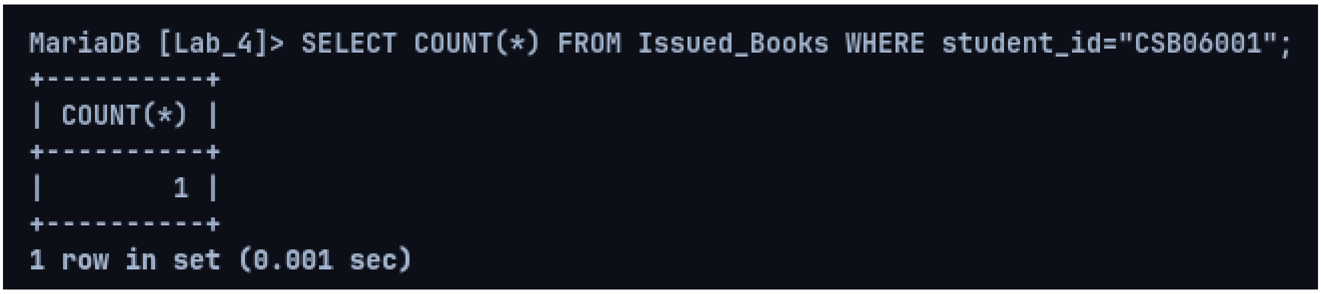
```
SELECT COUNT(*) FROM Books;
```



```
MariaDB [Lab_4]> SELECT COUNT(*) FROM Books;
+----------+
| COUNT(*) |
+----------+
|       10 |
+----------+
1 row in set (0.000 sec)
```

5. Count the number of books issued to a student with Roll no ‘CSB06001’

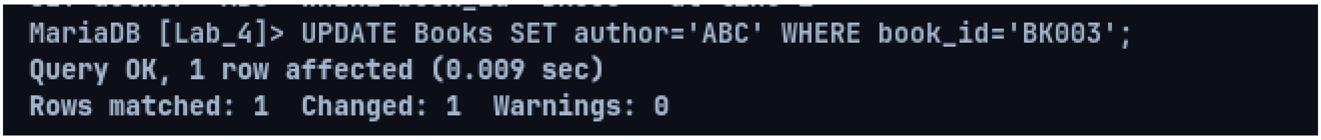
```
SELECT COUNT(*) FROM Issued_Books WHERE student_id="CSB06001";
```



```
MariaDB [Lab_4]> SELECT COUNT(*) FROM Issued_Books WHERE student_id="CSB06001";
+----------+
| COUNT(*) |
+----------+
|        1 |
+----------+
1 row in set (0.001 sec)
```

6. Change the author of the book to ‘ABC’ with book id=’BK003’.

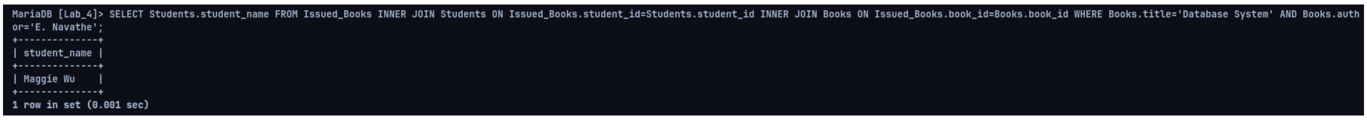
```
UPDATE Books
SET author='ABC' WHERE book_id='BK003';
```



```
MariaDB [Lab_4]> UPDATE Books SET author='ABC' WHERE book_id='BK003';
Query OK, 1 row affected (0.009 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

7. Retrieve the name of the student to whom the book named ‘Database System’, ‘E.Navathe’ is issued.

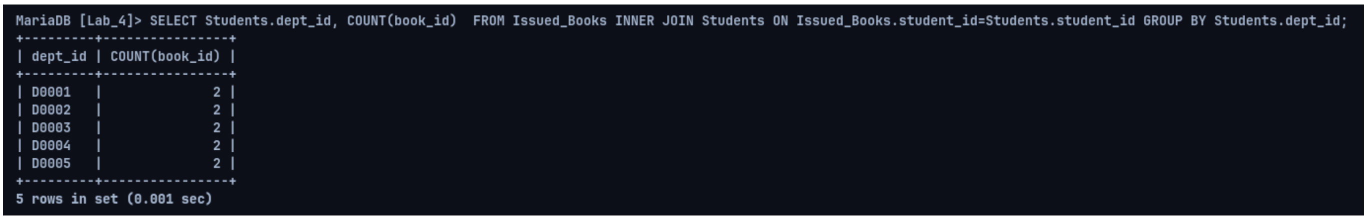
```
SELECT Students.student_name FROM Issued_Books INNER JOIN Students ON
Issued_Books.student_id=Students.student_id INNER JOIN Books ON
Issued_Books.book_id=Books.book_id WHERE Books.title='Database System' AND
Books.author='E. Navathe';
```



```
MariaDB [Lab_4]> SELECT Students.student_name FROM Issued_Books INNER JOIN Students ON Issued_Books.student_id=Students.student_id INNER JOIN Books ON Issued_Books.book_id=Books.book_id WHERE Books.title='Database System' AND Books.auth
or='E. Navathe';
+--------------+
| student_name |
+--------------+
| Maggie Wu    |
+--------------+
1 row in set (0.001 sec)
```

8. Display the total number of books issued to different departments.

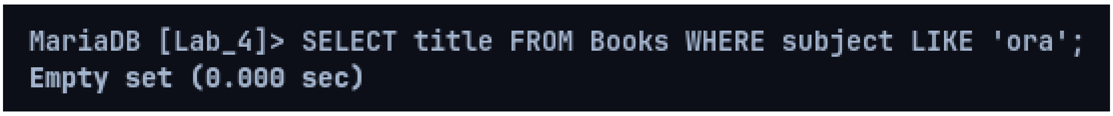
```
SELECT Students.dept_id, COUNT(book_id)  FROM Issued_Books INNER JOIN
Students ON Issued_Books.student_id=Students.student_id GROUP BY
Students.dept_id;
```



```
MariaDB [Lab_4]> SELECT Students.dept_id, COUNT(book_id)  FROM Issued_Books INNER JOIN Students ON Issued_Books.student_id=Students.student_id GROUP BY Students.dept_id;
+---------+----------------+
| dept_id | COUNT(book_id) |
+---------+----------------+
| D0001   |              2 |
| D0002   |              2 |
| D0003   |              2 |
| D0004   |              2 |
| D0005   |              2 |
+---------+----------------+
5 rows in set (0.001 sec)
```

9. List the name of the books where subject is like ‘ora’.

```sql
SELECT title FROM Books WHERE subject LIKE 'ora';
```



```
MariaDB [Lab_4]> SELECT title FROM Books WHERE subject LIKE 'ora';
Empty set (0.000 sec)
```