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REPORT for PROJECT # 02

(Advanced SQL)

CPS593-01 “Database Management”

(Professor Hanh Pham)

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Business Situation:

A bookstore needs to update its database based on total sell of its books, purchase made, and tax paid by customers while purchasing. They need to get and store data of customers who are purchasing specific books, sorting the customers based on their name or tax paid by them. Sometimes bookstore also need to store data of Most Expensive books available in their store and store the count of books purchased by customers.

Let's recall what data we have got after step-10 in Project 1 in the table "MyStore":

TABLE **MyStore**

```
MariaDB [tidkea1_db]> SELECT * FROM MyStore;
```

| book | customer | tax |
|------|----------|-----|
| 011 | AB | 2.2 |
| 013 | AD | 4.1 |
| 014 | BA | 3.4 |
| 015 | BB | 2.5 |
| 016 | BD | 3.5 |
| 018 | DB | 4.2 |
| 019 | DC | 3.8 |

7 rows in set (0.00 sec)

By using commands given below we can update and maintain bookstore's database.

STEP-1: **CHANGE** the **data type** of a **COLUMN** in a table:

```
MariaDB [tidkea1_db]> ALTER TABLE MyStore MODIFY COLUMN book INT(2);
```

After typing command, you will get this:

```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu...
[MariaDB [tidkea1_db]> ALTER TABLE MyStore MODIFY COLUMN book INT(2);
Query OK, 0 rows affected (0.01 sec)
Records: 0 Duplicates: 0 Warnings: 0

[MariaDB [tidkea1_db]> SELECT * FROM MyStore;
+-----+-----+-----+
| book | customer | tax |
+-----+-----+-----+
| 11 | AB | 2.2 |
| 13 | AD | 4.1 |
| 14 | BA | 3.4 |
| 15 | BB | 2.5 |
| 16 | BD | 3.5 |
| 18 | DB | 4.2 |
| 19 | DC | 3.8 |
+-----+-----+-----+
7 rows in set (0.00 sec)

MariaDB [tidkea1_db]> █
```

STEP-2: **GET/Retrieve** particular data using a keyword (with WHERE ... = "keyword");

Example 1:

```
MariaDB [tidkea1_db]> SELECT book, tax
                        FROM MyStore
                        WHERE customer = 'AD';
```

After that the output of this query will look like this:

```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu...

+-----+-----+-----+
| book | customer | tax |
+-----+-----+-----+
| 11 | AB | 2.2 |
| 13 | AD | 4.1 |
| 14 | BA | 3.4 |
| 15 | BB | 2.5 |
| 16 | BD | 3.5 |
| 18 | DB | 4.2 |
| 19 | DC | 3.8 |
+-----+-----+-----+
7 rows in set (0.01 sec)

[MariaDB [tidkea1_db]> SELECT book, tax
-> FROM MyStore
-> WHERE customer = 'AD';
]

+-----+-----+
| book | tax |
+-----+-----+
| 13 | 4.1 |
+-----+-----+
1 row in set (0.00 sec)

MariaDB [tidkea1_db]>
```

Example 2:

```
MariaDB [tidkea1_db]> SELECT book, customer
                        FROM MyStore
                        WHERE tax > 3 AND tax < 4;
```

```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu...

[MariaDB [tidkea1_db]> SELECT book, tax
-> FROM MyStore
-> WHERE customer = 'AD';
]

+-----+-----+
| book | tax |
+-----+-----+
| 13 | 4.1 |
+-----+-----+
1 row in set (0.00 sec)

[MariaDB [tidkea1_db]> SELECT book, customer
-> FROM MyStore
-> WHERE tax>3 AND tax<4;
]

+-----+-----+
| book | customer |
+-----+-----+
| 14 | BA |
| 16 | BD |
| 19 | DC |
+-----+-----+
3 rows in set (0.01 sec)

MariaDB [tidkea1_db]>
```

STEP-3: **Make a COPY** of a table;

Example 1:

```
MariaDB [tidkea1_db]> CREATE TABLE NewMyStore  
AS (SELECT * FROM MyStore);
```

This would create a new table called **NewMyStore** which is an exact copy of the **MyStore** table.

```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x37  
MariaDB [tidkea1_db]> SHOW TABLES;  
+-----+  
| Tables_in_tidkea1_db |  
+-----+  
| MyStore               |  
+-----+  
1 row in set (0.00 sec)  
  
MariaDB [tidkea1_db]> CREATE TABLE NewMyStore  
-> AS (SELECT * FROM MyStore);  
Query OK, 7 rows affected (0.04 sec)  
Records: 7 Duplicates: 0 Warnings: 0  
  
MariaDB [tidkea1_db]> SHOW TABLES;  
+-----+  
| Tables_in_tidkea1_db |  
+-----+  
| MyStore              |  
| NewMyStore           |  
+-----+  
2 rows in set (0.00 sec)  
  
MariaDB [tidkea1_db]> SELECT * FROM NewMyStore;  
+----+-----+-----+  
| book | customer | tax |  
+----+-----+-----+  
| 11   | AB       | 2.2 |  
| 13   | AD       | 4.1 |  
| 14   | BA       | 3.4 |  
| 15   | BB       | 2.5 |  
| 16   | BD       | 3.5 |  
| 18   | DB       | 4.2 |  
| 19   | DC       | 3.8 |  
+----+-----+-----+  
7 rows in set (0.01 sec)  
  
MariaDB [tidkea1_db]> █
```

Example 2:

```
MariaDB [tidkea1_db]> CREATE TABLE MiniMyStore  
AS (SELECT * FROM MyStore WHERE tax < 3);
```

This would create a new table called **MiniMyStore** based on the **MyStore** table.

Screenshot:

```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x25
MariaDB [tidkea1_db]> CREATE TABLE MiniMyStore
-> AS (SELECT * FROM MyStore WHERE tax<3);
Query OK, 2 rows affected (0.01 sec)
Records: 2 Duplicates: 0 Warnings: 0

MariaDB [tidkea1_db]> SHOW TABLES;
+-----+
| Tables_in_tidkea1_db |
+-----+
| MiniMyStore          |
| MyStore              |
| NewMyStore           |
+-----+
3 rows in set (0.01 sec)

MariaDB [tidkea1_db]> SELECT * FROM MiniMyStore;
+----+-----+-----+
| book | customer | tax |
+----+-----+-----+
| 11   | AB       | 2.2 |
| 15   | BB       | 2.5 |
+----+-----+-----+
2 rows in set (0.01 sec)

MariaDB [tidkea1_db]>
```

STEP-4: DELETE a table;

```
MariaDB [tidkea1_db]> DROP TABLE NewMyStore;
```

Screenshot:

```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x13
MariaDB [tidkea1_db]> DROP TABLE NewMyStore;
Query OK, 0 rows affected (0.01 sec)

MariaDB [tidkea1_db]> SHOW TABLES;
+-----+
| Tables_in_tidkea1_db |
+-----+
| MiniMyStore          |
| MyStore              |
+-----+
2 rows in set (0.01 sec)

MariaDB [tidkea1_db]>
```

```
MariaDB [tidkea1_db]> DROP TABLE MiniMyStore;
```

Screenshot:

```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x13
MariaDB [tidkea1_db]> DROP TABLE MiniMyStore;
Query OK, 0 rows affected (0.00 sec)

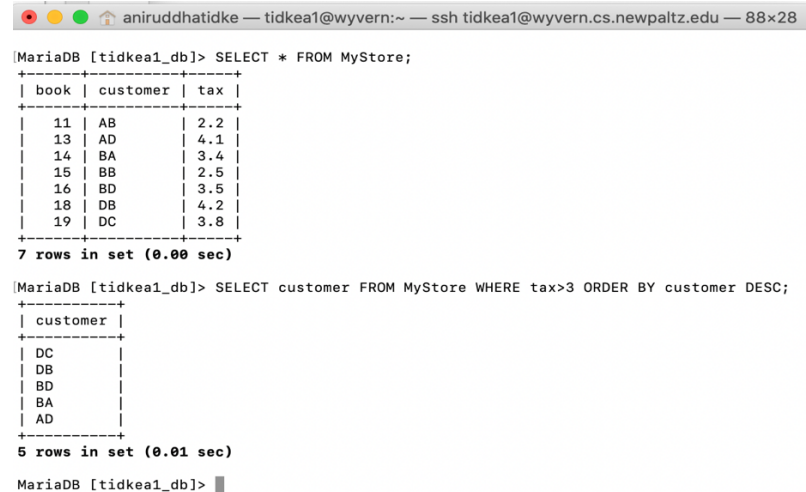
MariaDB [tidkea1_db]> SHOW TABLES;
+-----+
| Tables_in_tidkea1_db |
+-----+
| MyStore              |
+-----+
1 row in set (0.00 sec)

MariaDB [tidkea1_db]>
```

STEP-5: FILTER and SORT data from a table using **ORDER BY** clause

```
MariaDB [tidkea1_db]> SELECT customer FROM MyStore WHERE tax > 3  
ORDER BY customer DESC;
```

Screenshot:

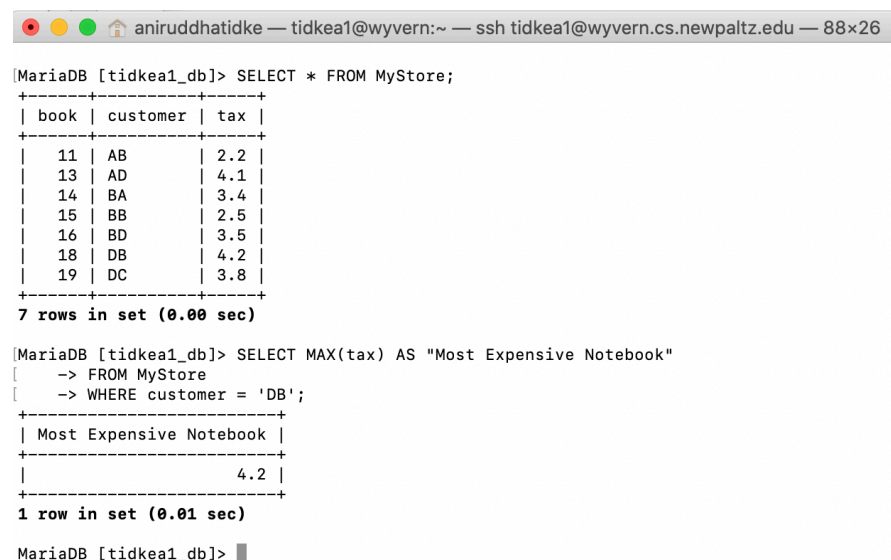


```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x28  
MariaDB [tidkea1_db]> SELECT * FROM MyStore;  
+-----+-----+-----+  
| book | customer | tax |  
+-----+-----+-----+  
| 11 | AB | 2.2 |  
| 13 | AD | 4.1 |  
| 14 | BA | 3.4 |  
| 15 | BB | 2.5 |  
| 16 | BD | 3.5 |  
| 18 | DB | 4.2 |  
| 19 | DC | 3.8 |  
+-----+-----+-----+  
7 rows in set (0.00 sec)  
  
MariaDB [tidkea1_db]> SELECT customer FROM MyStore WHERE tax>3 ORDER BY customer DESC;  
+-----+  
| customer |  
+-----+  
| DC |  
| DB |  
| BD |  
| BA |  
| AD |  
+-----+  
5 rows in set (0.01 sec)  
  
MariaDB [tidkea1_db]>
```

STEP-6: Use SQL functions to get MAX, MIN, AVE ... based on data from a table

```
MariaDB [tidkea1_db]> SELECT MAX(tax) AS "Most Expensive Notebook"  
FROM MyStore  
WHERE customer = 'DB';
```

Screenshot:

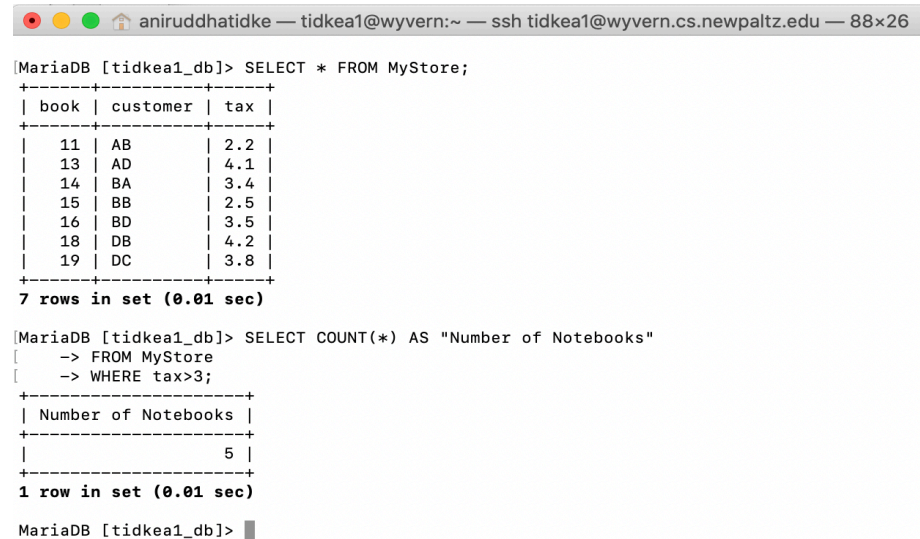


```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x26  
MariaDB [tidkea1_db]> SELECT * FROM MyStore;  
+-----+-----+-----+  
| book | customer | tax |  
+-----+-----+-----+  
| 11 | AB | 2.2 |  
| 13 | AD | 4.1 |  
| 14 | BA | 3.4 |  
| 15 | BB | 2.5 |  
| 16 | BD | 3.5 |  
| 18 | DB | 4.2 |  
| 19 | DC | 3.8 |  
+-----+-----+-----+  
7 rows in set (0.00 sec)  
  
MariaDB [tidkea1_db]> SELECT MAX(tax) AS "Most Expensive Notebook"  
-> FROM MyStore  
-> WHERE customer = 'DB';  
+-----+  
| Most Expensive Notebook |  
+-----+  
| 4.2 |  
+-----+  
1 row in set (0.01 sec)  
  
MariaDB [tidkea1_db]>
```


STEP-7: Use **SQL function COUNT** to get define the size of data from a table

```
MariaDB [tidkea1_db]> SELECT COUNT(*) AS "Number of Notebooks"
FROM MyStore
WHERE tax > 3;
```

Screenshot:



```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x26

MariaDB [tidkea1_db]> SELECT * FROM MyStore;
+-----+-----+-----+
| book | customer | tax |
+-----+-----+-----+
| 11 | AB | 2.2 |
| 13 | AD | 4.1 |
| 14 | BA | 3.4 |
| 15 | BB | 2.5 |
| 16 | BD | 3.5 |
| 18 | DB | 4.2 |
| 19 | DC | 3.8 |
+-----+-----+-----+
7 rows in set (0.01 sec)

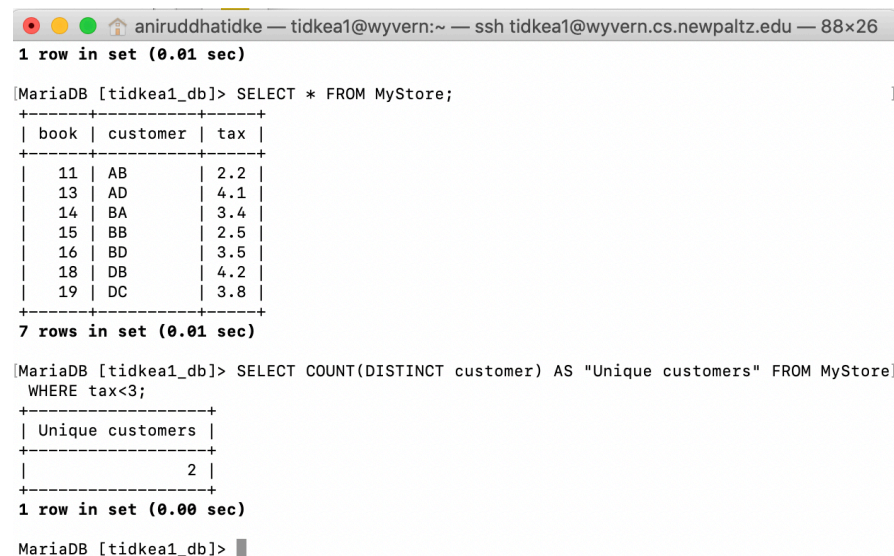
MariaDB [tidkea1_db]> SELECT COUNT(*) AS "Number of Notebooks"
-> FROM MyStore
-> WHERE tax>3;
+-----+
| Number of Notebooks |
+-----+
| 5 |
+-----+
1 row in set (0.01 sec)

MariaDB [tidkea1_db]>
```

STEP-8: Using **DISTINCT** clause

```
MariaDB [tidkea1_db]> SELECT COUNT(DISTINCT customer) AS "Unique customers"
FROM MyStore
WHERE tax < 3;
```

Screenshot:



```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x26

1 row in set (0.01 sec)

MariaDB [tidkea1_db]> SELECT * FROM MyStore;
+-----+-----+-----+
| book | customer | tax |
+-----+-----+-----+
| 11 | AB | 2.2 |
| 13 | AD | 4.1 |
| 14 | BA | 3.4 |
| 15 | BB | 2.5 |
| 16 | BD | 3.5 |
| 18 | DB | 4.2 |
| 19 | DC | 3.8 |
+-----+-----+-----+
7 rows in set (0.01 sec)

MariaDB [tidkea1_db]> SELECT COUNT(DISTINCT customer) AS "Unique customers" FROM MyStore
WHERE tax<3;
+-----+
| Unique customers |
+-----+
| 2 |
+-----+
1 row in set (0.00 sec)

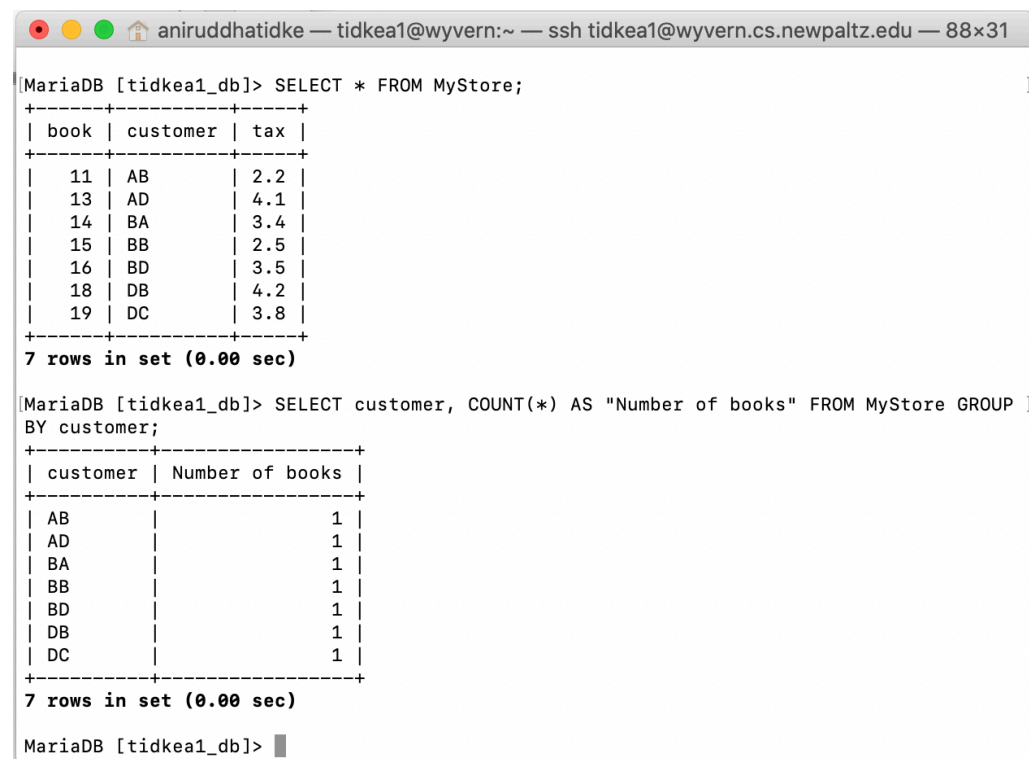
MariaDB [tidkea1_db]>
```


STEP-9: Using **GROUP BY** clause

If we want to know the number of books each customer is purchasing, then we can use command given below:

```
MariaDB [tidkea1_db]> SELECT customer, COUNT(*) AS "Number of books" FROM MyStore  
GROUP BY customer;
```

Screenshot:



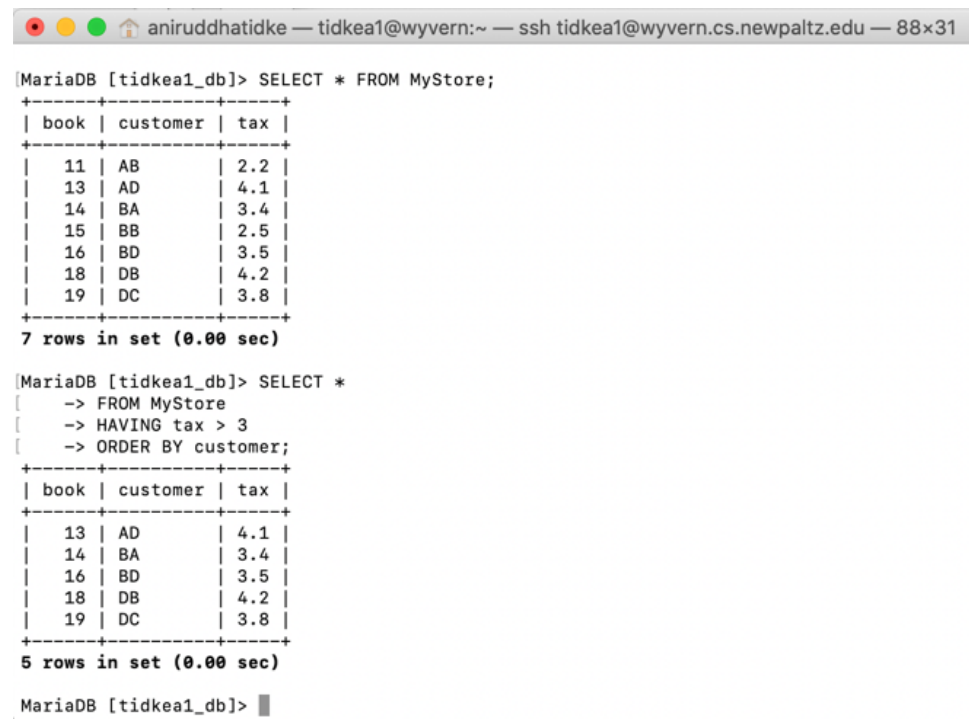
```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x31  
[MariaDB [tidkea1_db]> SELECT * FROM MyStore;  
+-----+-----+-----+  
| book | customer | tax |  
+-----+-----+-----+  
| 11 | AB | 2.2 |  
| 13 | AD | 4.1 |  
| 14 | BA | 3.4 |  
| 15 | BB | 2.5 |  
| 16 | BD | 3.5 |  
| 18 | DB | 4.2 |  
| 19 | DC | 3.8 |  
+-----+-----+-----+  
7 rows in set (0.00 sec)  
[MariaDB [tidkea1_db]> SELECT customer, COUNT(*) AS "Number of books" FROM MyStore GROUP  
BY customer;  
+-----+-----+  
| customer | Number of books |  
+-----+-----+  
| AB | 1 |  
| AD | 1 |  
| BA | 1 |  
| BB | 1 |  
| BD | 1 |  
| DB | 1 |  
| DC | 1 |  
+-----+-----+  
7 rows in set (0.00 sec)  
MariaDB [tidkea1_db]> █
```

STEP-10: Use **HAVING** clause

If we need to display books sorted/ordered by customer's name, but only (filter) for those with tax more than 3.

```
MariaDB [tidkea1_db]> SELECT *  
                        FROM MyStore  
                        HAVING tax > 3  
                        ORDER BY customer;
```

This would produce the following result:



```
aniruddhatidke — tidkea1@wyvern:~ — ssh tidkea1@wyvern.cs.newpaltz.edu — 88x31  
[MariaDB [tidkea1_db]> SELECT * FROM MyStore;  
+-----+-----+-----+  
| book | customer | tax |  
+-----+-----+-----+  
| 11 | AB | 2.2 |  
| 13 | AD | 4.1 |  
| 14 | BA | 3.4 |  
| 15 | BB | 2.5 |  
| 16 | BD | 3.5 |  
| 18 | DB | 4.2 |  
| 19 | DC | 3.8 |  
+-----+-----+-----+  
7 rows in set (0.00 sec)  
  
[MariaDB [tidkea1_db]> SELECT *  
  -> FROM MyStore  
  -> HAVING tax > 3  
  -> ORDER BY customer;  
+-----+-----+-----+  
| book | customer | tax |  
+-----+-----+-----+  
| 13 | AD | 4.1 |  
| 14 | BA | 3.4 |  
| 16 | BD | 3.5 |  
| 18 | DB | 4.2 |  
| 19 | DC | 3.8 |  
+-----+-----+-----+  
5 rows in set (0.00 sec)  
  
MariaDB [tidkea1_db]> █
```

In this way we can update and maintain Bookstore's database.