Question 1: Based on the past labs, create two database users (trans_user1 and trans_user2) at localhost with full privileges. (You may do this in the root account). Then, create a new test database with your name "Trans<name>", e.g., TransWei.

Command used:

1. CREATE USER 'trans_user1'IDENTIFIED BY 'P@ssw0rd';
2. CREATE USER 'trans_user2'IDENTIFIED BY 'P@ssw0rd';

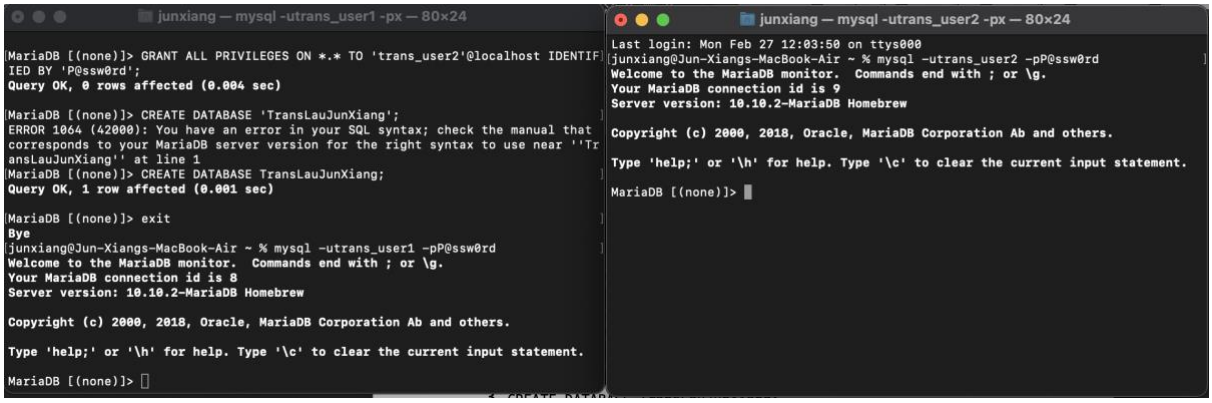
```
MariaDB [(none)]> CREATE USER 'trans_user1'IDENTIFIED BY 'P@ssw0rd'
    -> ;
Query OK, 0 rows affected (0.013 sec)

MariaDB [(none)]> CREATE USER 'trans_user2'IDENTIFIED BY 'P@ssw0rd';
Query OK, 0 rows affected (0.008 sec)

MariaDB [(none)]>
MariaDB [(none)]> GRANT ALL PRIVILEGES ON *.* TO 'trans_user1'@localhost IDENTIF
IED BY 'P@ssw0rd';
Query OK, 0 rows affected (0.006 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON *.* TO 'trans_user2'@localhost IDENTIF
IED BY 'P@ssw0rd';
Query OK, 0 rows affected (0.004 sec)

MariaDB [(none)]>
```

3. CREATE DATABASE TransLauJunXiang;

```
MariaDB [(none)]> CREATE DATABASE TransLauJunXiang;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]>
```

Question 2: Start TWO (2) sessions, each for one transaction user. (You may close the root user's session.) The 2 sessions run concurrently.

Command used:

1. 

Question 3: In trans_user1's session, create a new table "Students" in the database, with your familiar settings, e.g., column sid as integer and primary key, column sname as char, and column grade also as char. Select and show all data in the new table, and check if it is empty.

Command used:

1. CREATE TABLE Students (sid INT PRIMARY KEY, sname CHAR(30), grade CHAR(3));

```
MariaDB [TransLauJunXiang]> CREATE TABLE Students (sid INT PRIMARY KEY, sname CHAR(30), grade CHAR(3));
Query OK, 0 rows affected (0.037 sec)

MariaDB [TransLauJunXiang]>
```

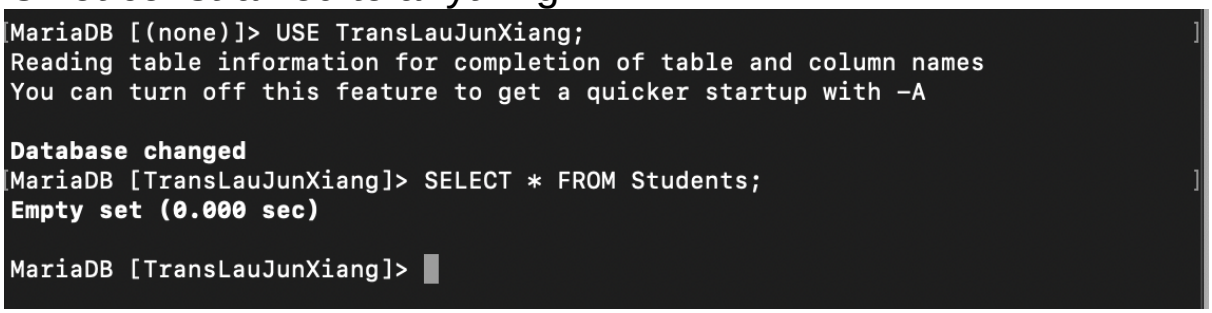
2. Through the use of the SQL command of SELECT statement, it has returned "Empty set" that indicates the table is indeed empty. Since the table was just created, there should also not be any data.

```
MariaDB [TransLauJunXiang]> SELECT * FROM Students;
Empty set (0.000 sec)

MariaDB [TransLauJunXiang]>
```

Question 4: In trans_user2's session, specify the same database. Select and show all the tables in the database. Observe and describe why or why not the table "Students' is visible in this session.

Command used:

1. Students table is visible from using trans_user2. It is because both users have been granted all privileges and it is not constrained to anything.



Question 5: Go back to trans_user1's session. Start a transaction. This is a key step. In the transaction, randomly insert 3 tuples into the table. Below are 3 sample tuples. 2104444, 'Lewis Hamilton', 'NA' 2103333, 'Max Verstappen', 'NA' <your student id>, <your name>, 'NA' Select and return the data in the table. You may not be surprised to see the tuples are already in the table.

Command used:

1.

START TRANSACTION;

INSERT INTO Students VALUES (2104444, "Lewis Hamilton", "NA");

INSERT INTO Students VALUES (2103333, "Max Verstappen", "NA");

INSERT INTO Students VALUES (2100582, "Lau Jun Xiang", "NA");

```
MariaDB [TransLauJunXiang]> START TRANSACTION;
Query OK, 0 rows affected (0.002 sec)

MariaDB [TransLauJunXiang]> INSERT INTO Students VALUES (2104444, "Lewis Hamilto
n", "NA");
Query OK, 1 row affected (0.000 sec)

MariaDB [TransLauJunXiang]> INSERT INTO Students VALUES (2103333, "Max Verstappe
n", "NA");
Query OK, 1 row affected (0.000 sec)

MariaDB [TransLauJunXiang]> INSERT INTO Students VALUES (2100582, "Lau Jun Xiang
", "NA");
Query OK, 1 row affected (0.000 sec)

MariaDB [TransLauJunXiang]>
```

Question 6: Switch back to trans_user2's session. Specify the database and show the tuples in the table "Students". Observe and describe why or why not the tuples you just inserted are visible in this session.

Command used:

1. Since the transaction was started by trans_user1 but not committed, trans_user2 will not be able to see.

2. SELECT * FROM Students --- From trans_user2

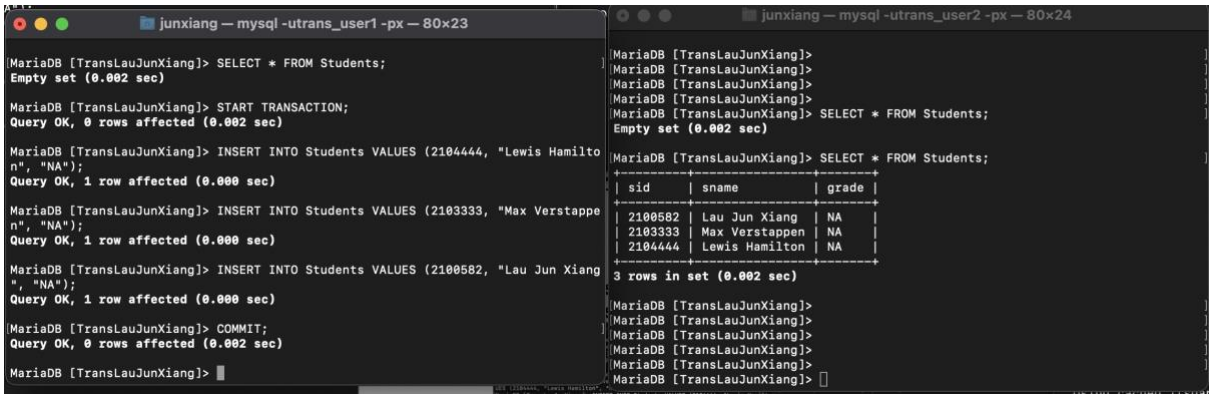
```
MariaDB [TransLauJunXiang]> SELECT * FROM Students;
Empty set (0.002 sec)

MariaDB [TransLauJunXiang]>
```

Question 7: Go back to trans_user1's session. Execute "COMMIT". Then in trans_user2's session, show the tuples in the table "Students" again. For one more time, observe and describe why or why not the tuples you just inserted are visible in this session.

Command used:

1. COMMIT; SQL command have been used on trans_user1 and SELECT * FROM Students have been used on trans_user2.

2. Since the COMMIT has been executed by trans_user1, trans_user2 will then be able to see the newly inserted data.



Question 8: In either session, start a transaction. In the transaction, first update the grade of Lewis Hamilton to ‘A’ and create a SAVEPOINT as sp_lh. Then, update the grade of yourself to ‘A’ as well and create another SAVEPOINT as sp_me. After the two update operations, execute ROLLBACK in the transaction. Select and return the data in the table. Observe and indicate if the grades have been updated successfully.

Command used:

1.

```
START TRANSACTION;
UPDATE Students SET grade = "A" WHERE sname = "Lewis Hamilton";
SAVEPOINT sp_lh;
UPDATE Students SET grade = "A" WHERE sname = "Lau Jun Xiang";
SAVEPOINT sp_me;
ROLLBACK;
SELECT * FROM Students;
```

```
MariaDB [TransLauJunXiang]> START TRANSACTION;
Query OK, 0 rows affected (0.003 sec)

MariaDB [TransLauJunXiang]> UPDATE Students SET grade = "A" WHERE sname = "Lewis
 Hamilton";
Query OK, 1 row affected (0.007 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [TransLauJunXiang]> SAVEPOINT sp_lh
    -> ;
Query OK, 0 rows affected (0.001 sec)

MariaDB [TransLauJunXiang]> UPDATE Students SET grade = "A" WHERE sname = "Lau J
un Xiang";
Query OK, 1 row affected (0.001 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [TransLauJunXiang]> SAVEPOINT sp_me;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> ROLLBACK;
Query OK, 0 rows affected (0.001 sec)

MariaDB [TransLauJunXiang]> SELECT * FROM Students;
+---------+---------------+-------+
| sid     | sname         | grade |
+---------+---------------+-------+
| 2100582 | Lau Jun Xiang | NA    |
| 2103333 | Max Verstappen | NA    |
| 2104444 | Lewis Hamilton | NA    |
+---------+---------------+-------+
3 rows in set (0.001 sec)

MariaDB [TransLauJunXiang]>
```

Question 9: Based on the above code, modify the ROLLBACK statement to roll back to the 1st SAVEPOINT, sp_lh. Select and return the data in the table. Observe and indicate if any grades have been updated.

grades have been updated successfully.

Command used:

1.

START TRANSACTION;

UPDATE Students SET grade = "A" WHERE sname = "Lewis Hamilton";

SAVEPOINT sp_lh;

UPDATE Students SET grade = "A" WHERE sname = "Lau Jun Xiang";

SAVEPOINT sp_me;

ROLLBACK to sp_lh;

As seen above, it rollback to sp_lh and my grade is still NA. This is because there was a snapshot at the point of time and I used the command to rollback before my

update made.

```
MariaDB [TransLauJunXiang]> START TRANSACTION;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> UPDATE Students SET grade = "A" WHERE sname = "Lewis
 Hamilton";
Query OK, 1 row affected (0.001 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [TransLauJunXiang]> SAVEPOINT sp_lh;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> UPDATE Students SET grade = "A" WHERE sname = "Lau J
un Xiang";
Query OK, 1 row affected (0.000 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [TransLauJunXiang]> SAVEPOINT sp_me;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> ROLLBACK to sp_lh;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> SELECT * FROM Students;
+---------+---------------+-------+
| sid     | sname         | grade |
+---------+---------------+-------+
| 2100582 | Lau Jun Xiang | NA    |
| 2103333 | Max Verstappen | NA    |
| 2104444 | Lewis Hamilton | A     |
+---------+---------------+-------+
3 rows in set (0.001 sec)

MariaDB [TransLauJunXiang]>
```

Question 10: Based on the above code, add one more statement right above the ROLLBACK one. The statement is to release the SAVEPOINT sp_lh.
Execute the new query. Observe if the execution is successful.grades have been updated successfully.

Command used:

1.

START TRANSACTION;

UPDATE Students SET grade = "A" WHERE sname = "Lewis Hamilton";

SAVEPOINT sp_lh;

UPDATE Students SET grade = "A" WHERE sname = "Lau Jun Xiang";

SAVEPOINT sp_me;

RELEASE SAVEPOINT sp_lh;

ROLLBACK;

SELECT * FROM Students;

```
MariaDB [TransLauJunXiang]> START TRANSACTION;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> UPDATE Students SET grade = "A" WHERE sname = "Lewis
 Hamilton";
Query OK, 1 row affected (0.001 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [TransLauJunXiang]> SAVEPOINT sp_lh;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> UPDATE Students SET grade = "A" WHERE sname = "Lau J
un Xiang";
Query OK, 1 row affected (0.000 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [TransLauJunXiang]> SAVEPOINT sp_me;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> RELEASE SAVEPOINT sp_lh;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> ROLLBACK;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> SELECT * FROM Students;
+---------+----------------+-------+
| sid     | sname          | grade |
+---------+----------------+-------+
| 2100582 | Lau Jun Xiang  | NA    |
| 2103333 | Max Verstappen | NA    |
| 2104444 | Lewis Hamilton | NA    |
+---------+----------------+-------+
3 rows in set (0.000 sec)

MariaDB [TransLauJunXiang]>
```

Question 10: Based on the above code, add one more statement right above the ROLLBACK one. The statement is to release the SAVEPOINT sp_lh.
Execute the new query. Observe if the execution is successful.grades have been updated successfully.

Command used:

1.
```
MariaDB [TransLauJunXiang]> START TRANSACTION;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> UPDATE Students SET grade = "A" WHERE sname = "Lewis
 Hamilton";
Query OK, 1 row affected (0.001 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [TransLauJunXiang]> SAVEPOINT sp_lh;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> UPDATE Students SET grade = "A" WHERE sname = "Lau J
un Xiang";
Query OK, 1 row affected (0.000 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [TransLauJunXiang]> SAVEPOINT sp_me;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> RELEASE SAVEPOINT sp_lh;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> ROLLBACK;
Query OK, 0 rows affected (0.000 sec)

MariaDB [TransLauJunXiang]> SELECT * FROM Students;
+---------+---------------+-------+
| sid     | sname         | grade |
+---------+---------------+-------+
| 2100582 | Lau Jun Xiang | NA    |
| 2103333 | Max Verstappen | NA    |
| 2104444 | Lewis Hamilton | NA    |
+---------+---------------+-------+
3 rows in set (0.000 sec)

MariaDB [TransLauJunXiang]>
```