Department of Computer Engineering University of Peradeniya

CO527 Advanced Database Systems

Lab Task:

1. I of ACID

I. Issue a select query to view the current status of the departments table in both sessions.

```
MariaDB [(none)]> USE company;
Database changed
MariaDB [company]> SELECT * FROM departments;
  dept_no | dept_name
  d001
            Marketing
  d002
            Finance
  d003
            Human Resources
  d004
            Production
  d005
            Development
  d006
            Quality Management
  d007
            Sales
  d008
            Research
  d009
            Customer Service
  rows in set (0.05 sec)
```

```
MariaDB [(none)]> USE company;
Database changed
MariaDB [company]> SELECT * FROM departments;
 dept_no | dept_name
           Marketing
 d001
 d002
            Finance
 d003
           Human Resources
 d004
            Production
 d005
           Development
            Quality Management
 d006
 d007
            Sales
 d008
            Research
 d009
           Customer Service
 rows in set (0.00 sec)
```

S1 S2

II. Now, start transaction running start transaction in both sessions.

MariaDB [company]> START TRANSACTION; Query OK, 0 rows affected (0.01 sec) MariaDB [company]> START TRANSACTION; Query OK, 0 rows affected (0.00 sec)

S1 S2

III. Insert a new row into the departments table from the 1st session and check if the changes are visible in the second session.

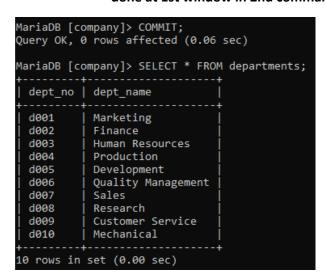
```
MariaDB [company]> INSERT INTO departments
   -> VALUES ('d010', 'Mechanical');
Query OK, 1 row affected (0.06 sec)
MariaDB [company]> SELECT * FROM departments;
  dept no
           dept_name
  d001
            Marketing
  d002
            Finance
  d003
            Human Resources
  d004
            Production
  d005
            Development
            Quality Management
  d006
  d007
            Sales
  d008
            Research
  d009
            Customer Service
  d010
           Mechanical
10 rows in set (0.00 sec)
```

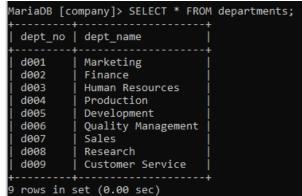
```
MariaDB [company]> SELECT * FROM departments;
 dept_no | dept_name
           Marketing
 d001
 d002
           Finance
           Human Resources
 d003
 d004
           Production
 d005
           Development
           Quality Management
 d006
 d007
           Sales
 d008
           Research
 d009
           Customer Service
 rows in set (0.00 sec)
```

S1 S2

New row is not shown in the session 2, but in session 1 it is shown.

IV. Commit changes in the 1st command window and check if you can see the updates done at 1st window in 2nd command window.





S1 S2

New row is not shown in the session 2, but in session 1 it is shown.

V. Explain your observations before and after running the commit in the 1st window.

Before committing the 1st window, updates are not visible in the 2nd window, because updates are not saved to the database by committing. After committing the 1st window, still updates are

not visible in the 2^{nd} window, because 2^{nd} window is still in the middle of the transaction process.

2. Concurrent Updates

Try to do a concurrent update to the same row in departments table during two transactions

```
MariaDB [company]> SELECT * FROM departments;
  dept_no | dept_name
            | Marketing
| Finance
| Human Resources
| Production
| Development
| Quality Management
| Sales
| Research
| Customer Service
| Mechanical
  d001
  d002
  d003
  d004
  d005
  d006
  d007
  d008
  d009
  d010
10 rows in set (0.00 sec)
MariaDB [company]> UPDATE departments
     -> SET dept_name="Computer"
     -> WHERE dept no='d010';
Query OK, 1 row affected (0.00 sec)
Rows matched: 1 Changed: 1 Warnings: 0
MariaDB [company]> SELECT * FROM departments;
  dept_no | dept_name
  d001 | Marketing
d002 | Finance
d003 | Human Resources
d004 | Production
d005 | Development
d006 | Quality Management
d007 | Sales
              | Research
| Customer Service
  d008
  d009
              Computer
  d010
10 rows in set (0.00 sec)
MariaDB [company]>
```

```
MariaDB [company]> UPDATE departments
-> SET dept_name="Civil"
-> WHERE dept_no='d010';
ERROR 1205 (HY000): Lock wait timeout exceeded; try restarting transaction
MariaDB [company]>
```

S2

II. Explain what happens before ending any of the transactions.

S1 update: ('d010', 'Computer')
S2 update: ('d010', 'Civil')

Before committing the transaction in S1, we cannot update S2.

III. What happens when you commit your changes in the 1st session?

```
dept_no | dept name
  d001
           Marketing
  d002
           Finance
  d003
           Human Resources
  d004
           Production
  d005
           Development
  d006
           Quality Management
  d007
            Sales
  d008
           Research
 d009
           Customer Service
 d010
           Computer
10 rows in set (0.00 sec)
MariaDB [company]> UPDATE departments
   -> SET dept_name="Civil"
   -> WHERE dept_no='d010';
Query OK, 1 row affected (0.00 sec)
Rows matched: 1 Changed: 1 Warnings: 0
MariaDB [company]> SELECT * FROM departments;
 dept_no | dept_name
           Marketing
  d002
           Finance
  d003
           Human Resources
  d004
           Production
  d005
           Development
  d006
            Quality Management
  d007
            Sales
  d008
            Research
  d009
           Customer Service
 d010
           Civil
10 rows in set (0.00 sec)
```

MariaDB [company]> SELECT * FROM departments;

```
MariaDB [company]> COMMIT;
Query OK, 0 rows affected (0.08 sec)
MariaDB [company]> SELECT * FROM departments;
  dept_no | dept_name
           Marketing
  d001
  d002
           Finance
  d003
           Human Resources
  d004
           Production
  d005
           Development
  d006
           Quality Management
  d007
           Sales
  d008
           Research
  dee9
           Customer Service
  d010
          Computer
10 rows in set (0.00 sec)
```

S1

```
S1 update: ('d010', 'Computer')
S2 update: ('d010', 'Civil')
```

After committing the transaction in S1, we can update S2 and here we can see the updated tables.

3. Use your imagination and words to write a scenario where using transactions is essential and then create the required tables and test how the transaction will effect your tables,

Let's create a simple database for a bookshop. Here is the 'books' table of the dataset.

```
MariaDB [(none)]> CREATE DATABASE book_shop;
Query OK, 1 row affected (0.06 sec)
MariaDB [(none)]> USE book_shop;
Database changed
```

I. during the transaction execution.

S2

Updates can't be seen

II. after rollback statement.

S1

Updates have been reversed

S2

No changes

III. after the commit statement.

```
MariaDB [book_shop]> COMMIT;
Query OK, 0 rows affected (0.00 sec)

MariaDB [book_shop]> select * from books where book_ID=001;

+-----+
| book_ID | book_code | book_name | book_price |

+----+
| 1 | NOVEL | Pilgrim's Progress | 500.00 |

+----+
1 row in set (0.00 sec)
```

S1

No updates

S2

No changes

IV. during 2 concurrent transactions, both of them update a record and both of them commit it.

S2

New values were updated