

DBMS Lab-5
Year 2015-16
Roll No:-1401010

Exercise-1

After Executing:-

Window1: begin;

Window1: update employee set salary = 45000 where ssn = '123456789';

Window2: begin;

Window2: select * from employee where ssn = '123456789';

Window-1

```
Database changed
mysql> update employee set salary = 45000 where ssn = '123456789';
Query OK, 1 row affected (0.08 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from employee;
```

| fname | sex | minit | salary | lname | superssn | ssn | dno | bdate | address |
|----------|-----|-------|--------|---------|-----------|-----------|-----|------------|--------------------------|
| John | M | B | 45000 | Smith | 333445555 | 123456789 | 5 | 1955-01-09 | 731 Fondren, Houston, TX |
| Franklin | M | T | 40000 | Wong | 888665555 | 333445555 | 5 | 1945-12-08 | 638 Voss, Houston, TX |
| Joyce | F | A | 25000 | English | 333445555 | 453453453 | 5 | 1962-07-31 | 5631 Rice, Houston, TX |
| Ramesh | M | K | 38000 | Narayan | 333445555 | 666884444 | 5 | 1952-09-15 | 975 Fire Oak, Humble, TX |
| James | M | E | 55000 | Borg | 888665555 | 888665555 | 1 | 1927-11-10 | 450 Stone, Houston, TX |
| Jennifer | F | S | 43000 | Wallace | 888665555 | 987654321 | 4 | 1931-06-20 | 291 Berry, Bellaire, TX |
| Ahmad | | U | | Jabbar | | 987987987 | | 1959-03-29 | 980 Dallas, Houston, TX |

Window-2

```
mysql> select * from employee where ssn = '123456789';
+-----+-----+-----+-----+-----+-----+-----+
| fname | minit | lname | ssn      | bdate      | address                | sex |
+-----+-----+-----+-----+-----+-----+-----+
| John  | B     | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX | M   |
|      | 30000 | 333445555 | 5 |
+-----+-----+-----+-----+-----+-----+-----+
```

->In Window 1 salary was 45000, while in Window 2 salary was 30000.

->It is because in Windows 1 the changes are stored in flash memory of transaction 1 and not in disk memory thus we cannot see Changed Salary in Windows 2.

After Executing:-

Window1: commit;

Window2: select * from employee where ssn = '123456789';

Window-2

```
mysql> select * from employee where ssn = '123456789';
+-----+-----+-----+-----+-----+-----+-----+
| fname | minit | lname | ssn      | bdate      | address                | sex |
+-----+-----+-----+-----+-----+-----+-----+
| John  | B     | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX | M   |
|      | 30000 | 333445555 | 5 |
+-----+-----+-----+-----+-----+-----+-----+
```

->We still see the salary 30,000, because we have not committed in Windows 2.

After Executing:-

Windows2 now shows updated salary of the employee.

Window2: commit;

Window-2

```
mysql> commit;
Query OK, 0 rows affected (0.00 sec)

mysql> select * from employee where ssn = '123456789';
+-----+-----+-----+-----+-----+-----+-----+
| fname | minit | lname | ssn      | bdate      | address                | se |
x | salary | superssn | dno | | | |
+-----+-----+-----+-----+-----+-----+-----+
| John  | B     | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX | M |
|      | 45000 | 333445555 | 5 | | | |
+-----+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

->Now salary is 45000 because it now flash memory of window 2 is refreshed with contents of disk memory after commit command.

Exercise-2

After Executing:-

Window1: begin;

Window1: update employee set salary = 45000 where ssn = '123456789';

Window-1

```
' at line 2
mysql> begin;
Query OK, 0 rows affected (0.00 sec)

mysql> update employee set salary = 45000 where ssn = '123456789';
Query OK, 0 rows affected (0.05 sec)
Rows matched: 1  Changed: 0  Warnings: 0

mysql> begin;
Query OK, 0 rows affected (0.09 sec)

mysql> select * from employee where ssn = '123456789';
+-----+-----+-----+-----+-----+-----+-----+
| fname | minit | lname | ssn      | bdate      | address                | sex |
+-----+-----+-----+-----+-----+-----+-----+
| John  | B      | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX | M   |
+-----+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql>
```

After Executing:-

Window2: begin;

Window2: update employee set salary = salary+3000 where ssn = '123456789';

Window 2

```
mysql> update employee set salary = salary+3000 where ssn = '123456789';
ERROR 1205 (HY000): Lock wait timeout exceeded; try restarting transaction
```

->Dead Lock happened.

->Now we have to abort T1 and then execute the upper command again

After Executing:-

Window2: begin;

Window2: update employee set salary = salary+3000 where ssn = '123456789';

Window1: commit;

Window2: commit;

Window2: select salary from employee where ssn = '123456789';

Window 2

```
mysql> update employee set salary = salary+3000 where ssn = '123456789';
Query OK, 1 row affected (0.12 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from employee where ssn = '123456789';
+-----+-----+-----+-----+-----+-----+-----+
| fname | minit | lname | ssn   | bdate   | address                | se |
| salary | superssn | dno |      |         |                        |    |
+-----+-----+-----+-----+-----+-----+-----+
| John  | B     | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX | M  |
| 33000 | 333445555 | 5 |      |         |                        |    |
+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

->T1 not happened because it was aborted

->Salary changed to 3300 by T2

Exercise-3

After Executing:-

Window1: begin;

Window1: update employee set salary = 45000 where ssn = '123456789';

Window2: begin;

Window2: update employee set salary = (select min(salary) from employee where ssn = '123456789')+3000 where ssn = '123456789';

Window 1

```
mysql> select * from employee;
```

| sex | salary | superssn | dno |
|----------|--------|-----------|-----------|
| John | B | Smith | 123456789 |
| M | 45000 | 333445555 | 5 |
| Franklin | T | Wong | 333445555 |
| M | 40000 | 888665555 | 5 |
| Joyce | A | English | 453453453 |
| F | 25000 | 333445555 | 5 |
| Ramesh | K | Narayan | 666884444 |
| M | 38000 | 333445555 | 5 |
| James | E | Borg | 888665555 |
| M | 55000 | NULL | 1 |
| Jennifer | S | Wallace | 987654321 |
| F | 43000 | 888665555 | 4 |
| Ahmad | U | Jabbar | 987987987 |
| M | 25000 | 987654321 | 4 |
| Alicia | J | Zelaya | 999887777 |
| F | 25000 | 987654321 | 4 |

Window 2

```
mysql> select * from employee;
```

| fname | minit | lname | ssn | bdate | address |
|----------|--------|-----------|-----------|------------|--------------------------|
| sex | salary | superssn | dno | | |
| John | B | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX |
| M | 28000 | 333445555 | 5 | | |
| Franklin | T | Wong | 333445555 | 1945-12-08 | 638 Voss, Houston, TX |
| M | 40000 | 888665555 | 5 | | |
| Joyce | A | English | 453453453 | 1962-07-31 | 5631 Rice, Houston, TX |
| F | 25000 | 333445555 | 5 | | |
| Ramesh | K | Narayan | 666884444 | 1952-09-15 | 975 Fire Oak, Humble, TX |
| M | 38000 | 333445555 | 5 | | |
| James | E | Borg | 888665555 | 1927-11-10 | 450 Stone, Houston, TX |
| M | 55000 | NULL | 1 | | |
| Jennifer | S | Wallace | 987654321 | 1931-06-20 | 291 Berry, Bellaire, TX |
| F | 43000 | 888665555 | 4 | | |
| Ahmad | V | Jabbar | 987987987 | 1959-03-29 | 980 Dallas, Houston, TX |
| M | 25000 | 987654321 | 4 | | |
| Alicia | J | Zelaya | 999887777 | 1958-07-19 | 3321 Castle, Spring, TX |
| F | 25000 | 987654321 | 4 | | |

->The changes are in flash memory and not stored to disk.

After executing:-

Window1: commit;

Window2: commit;

Window2: select * from employee where ssn = '123456789';

Window 2

```
mysql> commit;
Query OK, 0 rows affected (0.09 sec)

mysql> select * from employee;
+-----+-----+-----+-----+-----+-----+
| fname | minit | lname | ssn   | bdate | address |
| sex  | salary | superssn | dno |      |         |
+-----+-----+-----+-----+-----+-----+
| John  | B     | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX |
| M     | 28000 | 333445555 | 5 |      |         |
| Franklin | T     | Wong  | 333445555 | 1945-12-08 | 638 Voss, Houston, TX |
| M     | 40000 | 888665555 | 5 |      |         |
| Joyce | A     | English | 453453453 | 1962-07-31 | 5631 Rice, Houston, TX |
| F     | 25000 | 333445555 | 5 |      |         |
| Ramesh | K     | Narayan | 666884444 | 1952-09-15 | 975 Fire Oak, Humble, TX |
| M     | 38000 | 333445555 | 5 |      |         |
| James | E     | Borg   | 888665555 | 1927-11-10 | 450 Stone, Houston, TX |
| M     | 55000 | NULL   | 1 |      |         |
| Jennifer | S     | Wallace | 987654321 | 1931-06-20 | 291 Berry, Bellaire, TX |
| F     | 43000 | 888665555 | 4 |      |         |
| Ahmad | V     | Jabbar | 987987987 | 1959-03-29 | 980 Dallas, Houston, TX |
| M     | 25000 | 987654321 | 4 |      |         |
| Alicia | J     | Zelaya | 999887777 | 1958-07-19 | 3321 Castle, Spring, TX |
| F     | 25000 | 987654321 | 4 |      |         |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)
```

->Now as last commit was done by T2 its value would be stored in disk memory and we will see this value after commit.

Exercise-4

After Executing:-

set transaction isolation level serializable;

Window1: begin;

Window1: update employee set salary = 45000 where ssn = '123456789';

Window2: begin;

Window2: update employee set salary = (select min(salary) from employee where ssn = '123456789')+3000 where ssn = '123456789';

Window 1

```
mysql> select * from employee;
```

| sex | salary | superssn | dno |
|----------|--------|-----------|-----------|
| John | B | Smith | 123456789 |
| M | 45000 | 333445555 | 5 |
| Franklin | T | Wong | 333445555 |
| M | 40000 | 888665555 | 5 |
| Joyce | A | English | 453453453 |
| F | 25000 | 333445555 | 5 |
| Ramesh | K | Narayan | 666884444 |
| M | 38000 | 333445555 | 5 |
| James | E | Borg | 888665555 |
| M | 55000 | NULL | 1 |
| Jennifer | S | Wallace | 987654321 |
| F | 43000 | 888665555 | 4 |
| Ahmad | V | Jabbar | 987987987 |
| M | 25000 | 987654321 | 4 |
| Alicia | J | Zelaya | 999887777 |
| F | 25000 | 987654321 | 4 |

Window 2

```
mysql> select * from employee;
```

| fname | minit | lname | ssn | bdate | address |
|----------|--------|-----------|-----------|------------|--------------------------|
| sex | salary | superssn | dno | | |
| John | B | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX |
| M | 28000 | 333445555 | 5 | | |
| Franklin | T | Wong | 333445555 | 1945-12-08 | 638 Voss, Houston, TX |
| M | 40000 | 888665555 | 5 | | |
| Joyce | A | English | 453453453 | 1962-07-31 | 5631 Rice, Houston, TX |
| F | 25000 | 333445555 | 5 | | |
| Ramesh | K | Narayan | 666884444 | 1952-09-15 | 975 Fire Oak, Humble, TX |
| M | 38000 | 333445555 | 5 | | |
| James | E | Borg | 888665555 | 1927-11-10 | 450 Stone, Houston, TX |
| M | 55000 | NULL | 1 | | |
| Jennifer | S | Wallace | 987654321 | 1931-06-20 | 291 Berry, Bellaire, TX |
| F | 43000 | 888665555 | 4 | | |
| Ahmad | V | Jabbar | 987987987 | 1959-03-29 | 980 Dallas, Houston, TX |
| M | 25000 | 987654321 | 4 | | |
| Alicia | J | Zelaya | 999887777 | 1958-07-19 | 3321 Castle, Spring, TX |
| F | 25000 | 987654321 | 4 | | |

->The changes are in flash memory and not stored to disk.

After executing:-

Window1: commit;

Window2: commit;

Window2: select * from employee where ssn = '123456789';

Window 2

```
mysql> commit;
Query OK, 0 rows affected (0.09 sec)

mysql> select * from employee;
+-----+-----+-----+-----+-----+-----+
| fname | minit | lname | ssn | bdate | address |
| sex | salary | superssn | dno | | |
+-----+-----+-----+-----+-----+-----+
| John | B | Smith | 123456789 | 1955-01-09 | 731 Fondren, Houston, TX |
| M | 28000 | 333445555 | 5 | | |
| Franklin | T | Wong | 333445555 | 1945-12-08 | 638 Voss, Houston, TX |
| M | 40000 | 888665555 | 5 | | |
| Joyce | A | English | 453453453 | 1962-07-31 | 5631 Rice, Houston, TX |
| F | 25000 | 333445555 | 5 | | |
| Ramesh | K | Narayan | 666884444 | 1952-09-15 | 975 Fire Oak, Humble, TX |
| M | 38000 | 333445555 | 5 | | |
| James | E | Borg | 888665555 | 1927-11-10 | 450 Stone, Houston, TX |
| M | 55000 | NULL | 1 | | |
| Jennifer | S | Wallace | 987654321 | 1931-06-20 | 291 Berry, Bellaire, TX |
| F | 43000 | 888665555 | 4 | | |
| Ahmad | V | Jabbar | 987987987 | 1959-03-29 | 980 Dallas, Houston, TX |
| M | 25000 | 987654321 | 4 | | |
| Alicia | J | Zelaya | 999887777 | 1958-07-19 | 3321 Castle, Spring, TX |
| F | 25000 | 987654321 | 4 | | |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)
```

->Now as last commit was done by T2 its value would be stored in disk memory and we will see this value after commit.

Exercise-5

After Executing:-

Window1: select ssn, salary from employee where ssn in('888665555', '123456789');

Window 1

```
mysql> use company;
Database changed
mysql> select ssn, salary from employee where ssn in('888665555', '123456789');
+-----+-----+
| ssn      | salary |
+-----+-----+
| 123456789 | 28000  |
| 888665555 | 55000  |
+-----+-----+
2 rows in set (0.01 sec)
```

After Executing:-

Window1: begin;

Window1: set transaction isolation level serializable;

Window2: begin;

Window2: set transaction isolation level serializable;

Window 1: update employee set salary = (select salary from employee where ssn = '888665555') where ssn = '123456789';

Window 2: update employee set salary = (select salary from employee where ssn = '123456789') where ssn = '888665555';

Window1: commit;

Window2: commit;

Window1: select ssn, salary from employee where ssn in('888665555', '123456789');

Window-1

```
mysql> commit;
Query OK, 0 rows affected (0.00 sec)

mysql> select ssn, salary from employee where ssn in('888665555', '123456789');
+-----+-----+
| ssn      | salary |
+-----+-----+
| 123456789 | 55000  |
| 888665555 | 55000  |
+-----+-----+
2 rows in set (0.00 sec)

mysql>
```

->The Salaries are Interchanged which should not happen

After Executing:-

select salary from employee where ssn = '888665555' for update;

Window 1: update employee set salary = (select salary from employee where ssn = '888665555') where ssn = '123456789';

Window 2: update employee set salary = (select salary from employee where ssn = '123456789') where ssn = '888665555';

Window1: commit;

Window2: commit;

Window1: select ssn, salary from employee where ssn in('888665555', '123456789');

Window-1

```
ERROR 1205 (HY000): Lock wait timeout exceeded; try restarting transaction
```