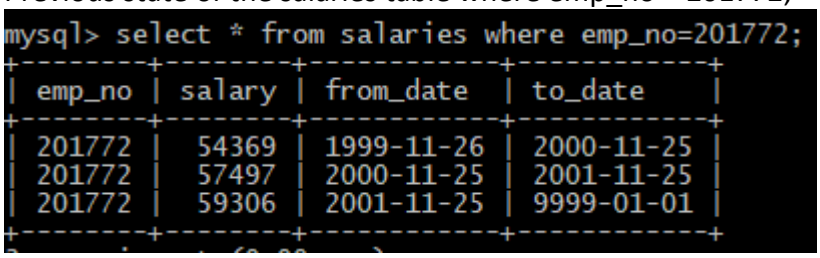
Transaction and Processing

E/15/202

Starting new Transaction

Previous state of the salaries table where emp_no = 201772;



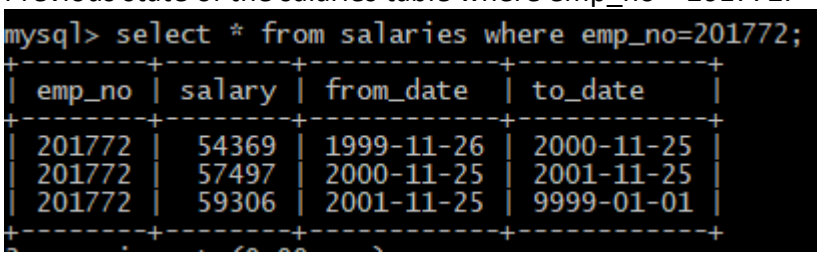
```
mysql> select * from salaries where emp_no=201772;
+--------+--------+------------+------------+
| emp_no | salary | from_date  | to_date    |
+--------+--------+------------+------------+
| 201772 |  54369 | 1999-11-26 | 2000-11-25 |
| 201772 |  57497 | 2000-11-25 | 2001-11-25 |
| 201772 |  59306 | 2001-11-25 | 9999-01-01 |
+--------+--------+------------+------------+
```

set autocommit = 1;
start transaction;
update salaries set salary = 1.1*salary where emp_no=201772;
select * from salaries where emp_no=201772;
rollback;

According to the MYSQL documentation (of using InnoDB as the engine) when the autocommit is enabled (set to 1) each sql statement forms a single transaction on its own. That means MySQL does a commit after each SQL statement, if that statement did not return an error.
When the above statements are executed in the wampserver although the autocommit is enabled since there is a rollback at the end it will be happen correctly. That means updated salaries will not be committed.
When autocommit is enabled that session can perform a multiple statement transaction.
When autocommit is disabled within a session it will always keep the transaction open. A commit or rollback statement will end the transaction.

Ending Transaction

Previous state of the salaries table where emp_no = 201772.



```
mysql> select * from salaries where emp_no=201772;
+--------+--------+------------+------------+
| emp_no | salary | from_date  | to_date    |
+--------+--------+------------+------------+
| 201772 |  54369 | 1999-11-26 | 2000-11-25 |
| 201772 |  57497 | 2000-11-25 | 2001-11-25 |
| 201772 |  59306 | 2001-11-25 | 9999-01-01 |
+--------+--------+------------+------------+
```

Note: After taking the results for each and every command COMMIT, ROLLBACK and START TRANSACTION the salaries table is again take back to the above state which is the original salaries table values.

1) **commit;**

   set autocommit = 0;
   start transaction;
   update salaries set salary = 1.1*salary where emp_no=201772;
   select * from salaries where emp_no=201772;

commit;

After executing above statements,

```
mysql> select * from salaries where emp_no=201772;
+--------+--------+------------+------------+
| emp_no | salary | from_date  | to_date    |
+--------+--------+------------+------------+
| 201772 |  59806 | 1999-11-26 | 2000-11-25 |
| 201772 |  63247 | 2000-11-25 | 2001-11-25 |
| 201772 |  65237 | 2001-11-25 | 9999-01-01 |
+--------+--------+------------+------------+
```

We can see that salaries table has been updated. Since we have added **commit;** the changes have been added to the database.

2) rollback;

set autocommit = 0;
start transaction;
update salaries set salary = 1.1*salary where emp_no=201772;
select * from salaries where emp_no=201772;
rollback;

After executing above statements,

```
mysql> select * from salaries where emp_no=201772;
+--------+--------+------------+------------+
| emp_no | salary | from_date  | to_date    |
+--------+--------+------------+------------+
| 201772 |  54369 | 1999-11-26 | 2000-11-25 |
| 201772 |  57497 | 2000-11-25 | 2001-11-25 |
| 201772 |  59306 | 2001-11-25 | 9999-01-01 |
+--------+--------+------------+------------+
```

When we add **rollback;** at the end of transaction it end the transaction and updated values will not be committed. So it still shows the previous state of the salaries table.

3) start transaction;

set autocommit = 0;
start transaction;
update salaries set salary = 1.1*salary where emp_no=201772;
start transaction;
select * from salaries where emp_no=201772;
rollback;
select * from salaries where emp_no=201772;

After executing the above statements,

```
mysql> select * from salaries where emp_no=201772;
+--------+--------+------------+------------+
| emp_no | salary | from_date  | to_date    |
+--------+--------+------------+------------+
| 201772 |  59806 | 1999-11-26 | 2000-11-25 |
| 201772 |  63247 | 2000-11-25 | 2001-11-25 |
| 201772 |  65237 | 2001-11-25 | 9999-01-01 |
+--------+--------+------------+------------+
```

We can see the updated values in the salaries table. We update the salaries table in the first transaction and then we start another transaction without committing or rollback. Then at the end of second transaction we rollback;
But after rollback also we can see the updated values added by the first transaction.
Although we started the second transaction without committing the first transaction the changes added by the first transaction has been committed to the database. So what we can conclude from this is that adding start transaction; will explicitly end the current transaction and the changes from current transaction will be committed.

Concurrent Access

1) I of ACID

1) First I opened two mysql consoles
2) Issued a select query to view the current status of the departments table in both sessions.
3) Then started transactions, running start transaction in both sessions.
4) I added,

   INSERT INTO departments VALUES ("d010","xyz");

   statement in the first session, then issued a select query in the second session to view the departments table.
   The newly added row was not visible in the second session. But still it is visible in the first session.
5) Then changes are committed in the first session. And again I issued a select query in the second session to view the departments table. But still the changes were not visible.
   It happens because the second session is still inside the transaction process.
6) I did not apply any changes inside the second session transaction. So I ended that transaction with a commit; command.
7) After that commit; again I issued a select query in the second session to view the departments table. Then the changes added by the first session was visible.

#First Session

```
mysql> use company;
Database changed
mysql> 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   |
+---------+--------------------+
9 rows in set (0.00 sec)

mysql> set autocommit = 0;
Query OK, 0 rows affected (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.00 sec)

mysql> insert into departments values ("d010","xyz");
Query OK, 1 row affected (0.00 sec)

mysql> 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   |
| d010    | xyz                |
+---------+--------------------+
10 rows in set (0.00 sec)

mysql> commit;
Query OK, 0 rows affected (0.06 sec)
```

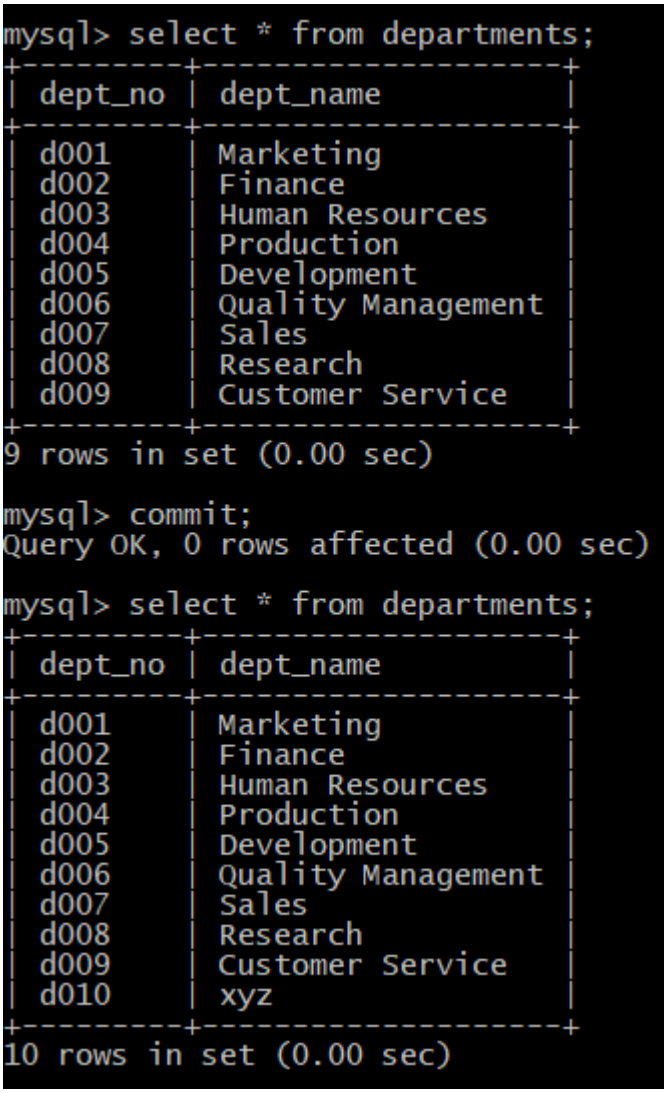
#Second Session

```
mysql> use company;
Database changed
mysql> 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   |
+---------+--------------------+
9 rows in set (0.00 sec)

mysql> set autocommit = 0;
Query OK, 0 rows affected (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.00 sec)

mysql> 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   |
+---------+--------------------+
9 rows in set (0.00 sec)
```



```
mysql> 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   |
+---------+--------------------+
9 rows in set (0.00 sec)

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

mysql> 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   |
| d010    | xyz                |
+---------+--------------------+
10 rows in set (0.00 sec)
```

2) Concurrent Updates

1) First I opened two mysql consoles
2) Issued a select query to view the current status of the departments table in both sessions.
3) Then started transactions, running start transaction in both sessions.
4) I added,

   UPDATE departments SET dept_name=”pqr” WHERE dept_no=”d010”;

   statement in the first session, and no error occurred. If I issued a select query in the first session to view the departments table, I was able to find that the changes have been updated.
5) Then I added,

   UPDATE departments SET dept_name="Hello" WHERE dept_no="d010";

   statement in the second session, but it was in the below state for some time and issued a timeout error.

```
mysql> set autocommit = 0;
Query OK, 0 rows affected (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.00 sec)

mysql> UPDATE departments SET dept_name="Hello" WHERE dept_no="d010";
```

```
mysql> set autocommit = 0;
Query OK, 0 rows affected (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.00 sec)

mysql> UPDATE departments SET dept_name="Hello" WHERE dept_no="d010";
ERROR 1205 (HY000): Lock wait timeout exceeded; try restarting transaction
```

6) Before the timeout happens, I committed the first transaction. Then not only the first session but also the second session showed an updated message. Below screenshot shows the updated message given by the second session.

```
mysql> UPDATE departments SET dept_name="Hello" WHERE dept_no="d010";
Query OK, 1 row affected (6.60 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

This shows that second session update has been done.

7) Then I issued a select query in the second session to view the departments table. It shows that the table has been updated with the second sessions update value. Since the second query is not committed, when I issued a select query in the first session to view the departments table, still it shows only the first sessions updated values.

8) Finally I committed the second session.
Select query for second session,

```
mysql> 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   |
| d010    | Hello              |
+---------+--------------------+
```

Select query for first session,

```
mysql> 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   |
| d010    | pqr                |
+---------+--------------------+
10 rows in set (0.00 sec)
```

As you can see still the first query does not show the updated values from second session. But when I got to the phpmyadmin, it showed the update value from the second session which is dept_name=”Hello”

Note: According to theory in this stage it should show the updated values from the second session since it has been already committed to the database. It can be ensured by checking the database using phpmyadmin.

9) So finally I wrote a commit; again in the first session, and ran select query. Then it showed the updated departments table. Which is,

```
mysql> 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   |
| d010    | Hello              |
+---------+--------------------+
```

#First session

```
mysql> 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   |
| d010    | xyz                |
+---------+--------------------+
10 rows in set (0.00 sec)

mysql> set autocommit = 0;
Query OK, 0 rows affected (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.00 sec)

mysql> update departments set dept_name="pqr" where dept_no="d010";
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> 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   |
| d010    | pqr                |
+---------+--------------------+
10 rows in set (0.00 sec)
```

```
mysql> commit;
Query OK, 0 rows affected (0.07 sec)

mysql> 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   |
| d010    | pqr                |
+---------+--------------------+
10 rows in set (0.00 sec)

mysql> 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   |
| d010    | pqr                |
+---------+--------------------+
10 rows in set (0.00 sec)

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

mysql> 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   |
| d010    | Hello              |
+---------+--------------------+
10 rows in set (0.00 sec)
```

#Second Session

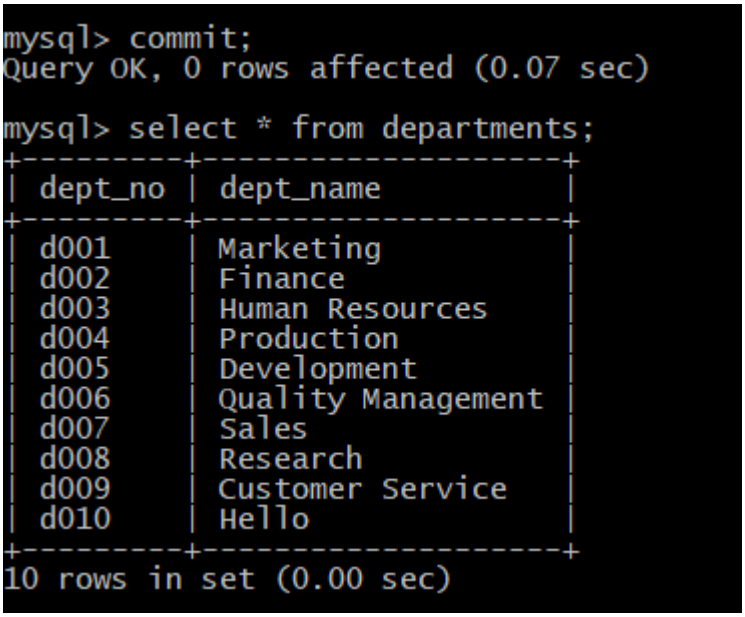
```
mysql> select * from departments;
+---------+--------------------+
| dept_no | dept_name          |
+---------+--------------------+
| d001    | Marketing          |
| d002    | Finance            |
| d003    | Human Resources    |
| d004    | Production         |
| d005    | Development        |
| d006    | Quality Management |
| d007    | Sales              |
| d008    | Research           |
| d009    | Customer Service   |
| d010    | xyz                |
+---------+--------------------+
10 rows in set (0.00 sec)

mysql> set autocommit = 0;
Query OK, 0 rows affected (0.00 sec)

mysql> start transaction;
Query OK, 0 rows affected (0.00 sec)

mysql> update departments set dept_name="Hello" where dept_no="d010";
Query OK, 1 row affected (6.39 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> 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   |
| d010    | Hello              |
+---------+--------------------+
10 rows in set (0.00 sec)
```


mysql> commit;
Query OK, 0 rows affected (0.07 sec)
mysql> 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
d010	Hello
10 rows in set (0.00 sec)