National University of Computer & Emerging Sciences, Karachi
Computer Science Department
Fall 2021, Lab Manual - 01

Course Code: CL-2005	Course : Database Systems Lab
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Contents:

DATABASE TRANSACTION:

A **TRANSACTION** consists of a collection of DML statementsthat form a logical unit of work.

A Database Transaction consist of one of the following statements.

1. DML statements that make up one consistent change to the data.
2. One DDL statement.
3. One DCL statement.

Transactions consist of DML statements that make up oneconsistent change to the data.

Example:

A transfer of funds between two accounts should include the debit to one account and credit to another account in the same amount. Both actions should either failed or succeed together; the credit should not be committed without the debit.

You can use the COMMIT, ROLLBACK, SAVEPOINT, and SET TRANSACTION command to control the transaction.

COMMIT: COMMIT command to make changes permanent save to a database during the current transaction.

ROLLBACK: ROLLBACK command execute at the end of current transaction and undo/undone any changes made since the begin transaction.

SAVEPOINT: SAVEPOINT command save the current point with the unique name in the processing of a transaction.

AUTOCOMMIT: Set AUTOCOMMIT ON to execute COMMIT Statement automatically.

SET TRANSACTION: PL/SQL SET TRANSACTION command set the transaction properties such as read-write/read only access.

Database Transaction begins when the first DML SQL statement is executed.

Ends with one of the following events

- COMMIT or ROLLBACK is issued.
- DDL or DCL statement executes (Automatic commit).
- User normally exits.

Advantages of Commit and Rollback Statements.

- Ensure Data Consistency.
- Preview data changes before making any permanent changes.
- Group logically related operations.

Implicit Transaction:

Automatic commit occurs under the following conditions

- DDL Statement is issued.
- DCL statement is issued.
- Normal Exit with command Exit from SQL * PLUS.

Automatic Rollback occurs under the following conditions.

- Abnormal Exit or termination of SQL * PLUS.
- System Failure.

Flow of Transaction Control

T#	Transaction	Explanation
t1	SET TRANSACTION NAME 'sal_update';	This statement begins a transaction and names it sal_update.
t2	UPDATE employees SET salary = 7000 WHERE last_name ='Banda';	This statement updates the salary for Banda to 7000.
t3	SAVEPOINT after_banda_sal;	This statement creates a savepoint named after_banda_sal, enabling changes in this transaction to be rolled back to this point.
t4	UPDATE employees SET salary = 12000 WHERE last_name = 'Greene';	This statement updates the salary for Greene to 12000.
t5	SAVEPOINT after_greene_sal;	This statement creates a savepoint named after_greene_sal, enabling changes in this transaction to be rolled back to this point.
t6	ROLLBACK TO SAVEPOINT after_banda_sal;	This statement rolls back the transaction to t3, undoing the update to Greene's salary at t4. The sal_update transaction has *not* ended.
t7	UPDATE employees SET salary = 11000 WHERE last_name = 'Greene';	This statement updates the salary for Greene to 11000 in transaction sal_update.

t8	ROLLBACK;	This statement rolls back all changes in transaction sal_update, ending the transaction.
t9	SET TRANSACTION NAME 'sal_update2';	This statement begins a new transaction in the session and names it sal_update2.
t10	UPDATE employees SET salary = 7050 WHERE last_name = 'Banda';	This statement updates the salary for Banda to 7050.
t11	UPDATE employees SET salary = 10950 WHERE last_name = 'Greene';	This statement updates the salary for Greene to 10950.
t12	COMMIT;	This statement commits all changes made in transaction sal_update2, ending the transaction. The commit guarantees that the changes are saved in the online redo log files.

Automatic Transaction Control

To execute a COMMIT automatically whenever an INSERT, UPDATE or DELETE command is executed, you can set the AUTOCOMMIT environment variable as −

```
SET AUTOCOMMIT ON;
```

You can turn-off the auto commit mode using the following command −

```
SET AUTOCOMMIT OFF;
```

Execting Queries on Different Transactions

Activity:

Create table worker by having following attributes.

```
create table worker(workerID varchar(20),
workerName varchar(255),
workerjob varchar(255),
constraint pk_Worker primary key(workerID));
```

Note that since the creation of a table is a **DDL** statement, there is no need for commit because Oracle SQL auto-commits it.

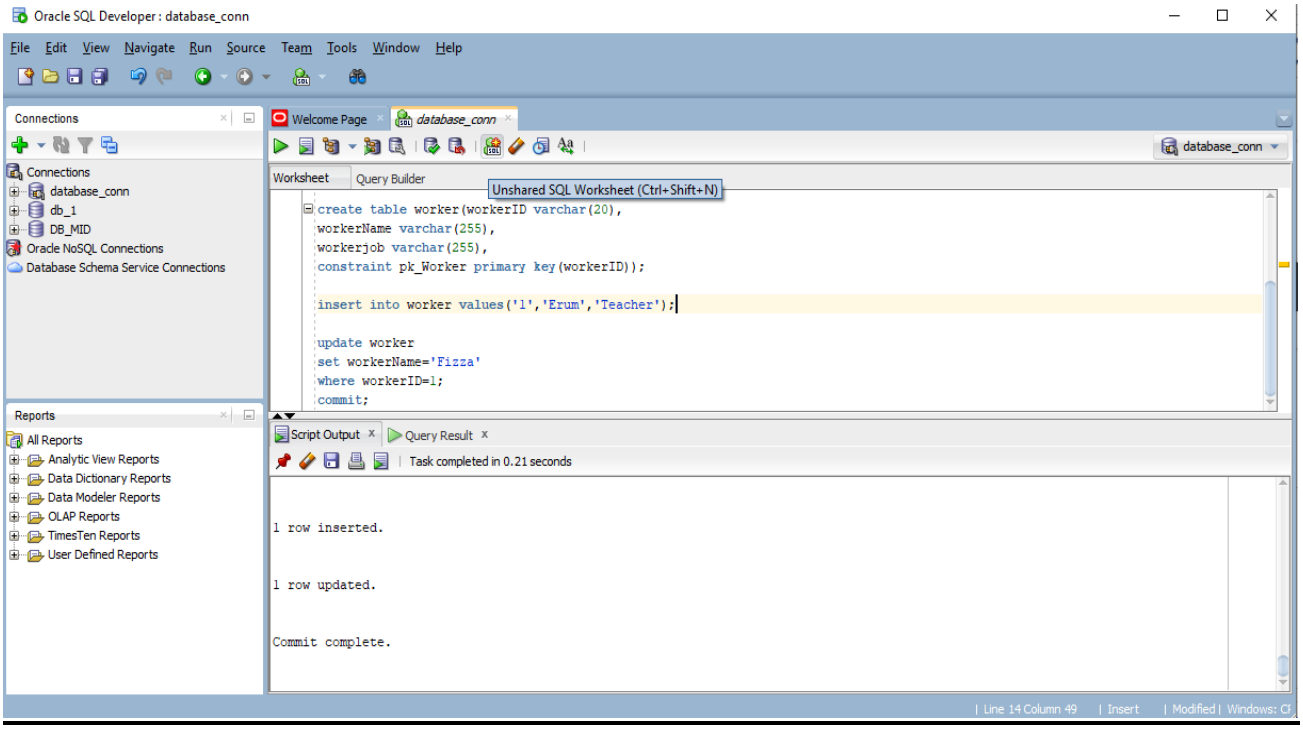
Insert a row in the worker table.

```
insert into worker values('1','Erum','Teacher');
```

After that, we should now have the new record on our database. In order to leave the record locked, we will now do an update on it, without committing the transaction.

```
update worker
set workerName='Fizza'
where workerID=1;
```

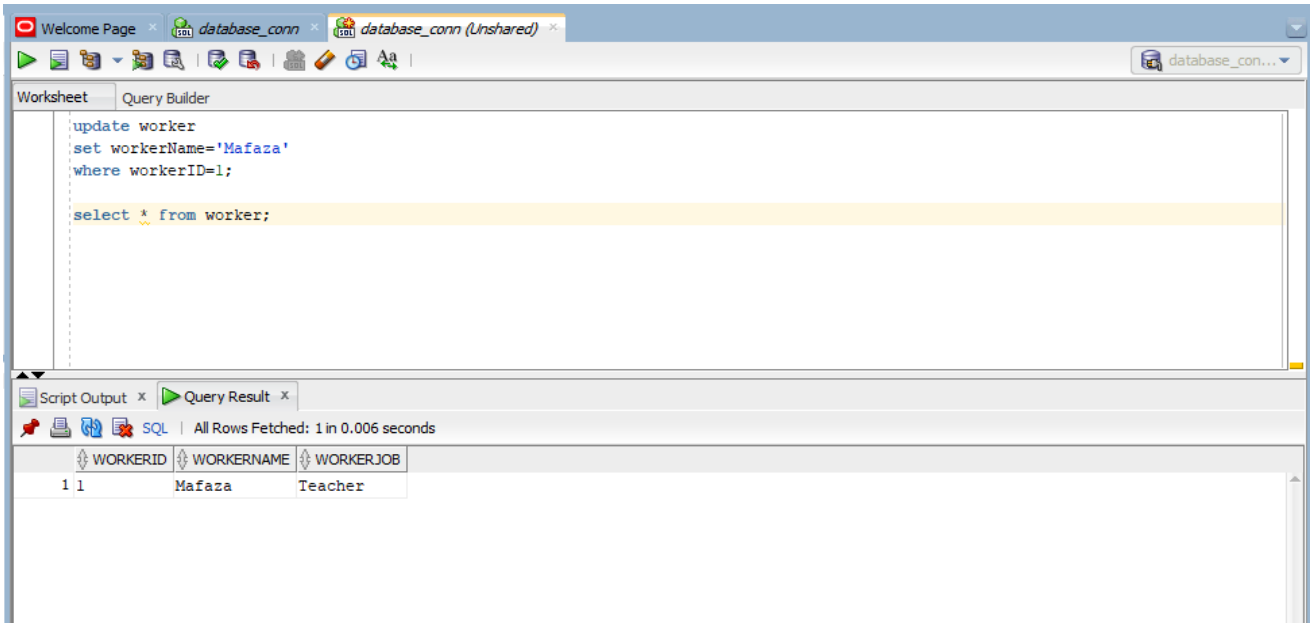
Now, we will open a new Unshared SQL Worksheet, as indicated in figure 1. The SQL statements executed in this sheet will be in a different transaction.



Now, to test if this is working correctly, execute another update statement on the same record, on the new unshared worksheet.

```
update worker
set workerName=''Mafaza
where workerID=1;
```

Since we had a transaction that updated that same recorded and haven't yet committed, the transaction on the new unshared worksheet will not update record so we need to go back to the pervious sheet and commit the transaction.



Tasks:

Taks:01 Create table persons having personID as primary key, FirstName,LastName,Address,City and age as attributes.

Add 10 records into persons and create a savepoint after inserting five records.

Update the record on personID=7 where FirstName=Erum and after updation it should be FirstName=Rida.

Now Rollback the transaction to savepoint1 and see the changes.

Task:02 By using above persons table update a record on personID=8 and change the age from 28 to 30 then without commiting change create a new session and update the record on PersonID=8 and set age=31. State what is the reason behind no updataion.