NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES

CL 203-Database Systems

Lab Session 07

Data-Manipulation Language

Data manipulation language is a core part of SQL. When we want to add, update or delete data in the database, we execute a DML statement. A collection of DML statements that form a logical unit of work is called a transaction.
Consider a banking database. When a bank customer transfers money from a savings account to a checking account, the transaction might consist of three separate operations: decrease the savings account, increase the checking account, and record the transaction in the transaction journal. The Oracle server must guarantee that all three SQL statements are performed to maintain the accounts in the proper balance. When something prevents one of the statements in the transaction from executing, the other statements of the transaction must be undone.
The SQL DML includes statements to perform following operations:-

Statement Description

INSERT	Enter new rows into tables
UPDATE	To change existing rows
DELETE	To delete existing rows

The INSERT INTO Statement

The INSERT INTO statement is used to insert a new row in a table.

INSERT INTO Syntax
INSERT INTO table_name
VALUES (value1, value2, value3,...)

OR

INSERT INTO table_name (column1, column2, column3,...)
VALUES (value1, value2, value3,...)

Examples

i. Inserting a new row in the dept table

```
INSERT INTO dept (deptno, dname, loc)
    VALUES (50,'DEVELOPMENT', 'DETROIT');
```

Note: If the column list is not included, the values must be listed according to the default order of the columns in the table. The order can be seen using the DESCRIBE command.

ii. Inserting rows with Null values

- *Implicit Method*: Omit the column from the column list.

  INSERT INTO dept (deptno, dname)

  VALUES (60, 'MIS');

- *Explicit Method:* Specify the NULL keyword

  INSERT INTO dept

  VALUES (70, 'FINANCE', NULL);

Note: The oracle server automatically enforces all datatypes, data ranges and data integrity constraints. Any column that is not listed explicitly obtains a null value in the new row.

iii. Using special values, for example, SYSDATE function, to obtain data for a column when inserting a row in a table

INSERT INTO emp (empno, ename, job, mgr, hiredate, sal, comm, deptno)
VALUES (7196, 'GREEN', 'SALESMAN', 7782, SYSDATE, 2000, NULL, 10);

Similarly we can also use the USER function when inserting rows in a table. The USER function records the current username.

iv. Adding a new employee by inserting specific date values

INSERT INTO emp

VALUES (2296, 'AROMANO', 'SALESMAN', 7782, TO_DATE('FEB 3, 97',

'MON DD, YY'), 1300, NULL, 10);

v. We can produce an INSERT statement that allows the user to add values interactively by using SQL*Plus substitution variables.

INSERT INTO dept (deptno, dname, loc)

VALUES (&department_id, '&department_name', '&location');

```
Enter value for department_id: 80

Enter value for department_name: EDUCATION
Enter value for location: ATLANTA
```

vi. Copying rows from another table

We can use the INSERT statement to add rows to a table where the values are derived from some other existing table. In place of the VALUES clause, we use a subquery. e.g. to insert rows from EMP table to EMP10 table,

```
INSERT INTO EMP10

SELECT * FROM EMP
WHERE DEPTNO = 10;
```

The Update Statement:

The UPDATE statement is used to update existing records in a table.

SQL UPDATE Syntax

```
UPDATE table_name
SET column1=value1,column2=value2,...
WHERE some_column=some_value;
```

Example:

```
UPDATE emp
SET eName='SMITH', Sal=5000
WHERE eName='JONES';
```

Delete Statement:

You can delete specific rows by specifying the WHERE clause in the DELETE statement.

The following example deletes the DEVELOPMENT department from the DEPARTMENT table:

- DELETE FROM department WHERE dname = 'DEVELOPMENT';
- DELETE FROM department;

Database Transactions

The oracle server ensures data consistency based on transactions. Transactions consist of DML statements that makeup one consistent change to the data. For example, a transfer of funds between two accounts should include the debit to one account and a credit to another account in the same amount. Both actions should either fail or succeed together. The credit should not be committed without the debit.

Types of Transaction

Data Manipulation language (DML): Consists of any number of DML statements that the Oracle Server treats as a single entity or a logical unit of work.

Data Definition language (DDL): Consists of only one DDL statement.

Data Control language (DCL): Consists of only one DCL statement.

A transaction begins when the first executable SQL statement is encountered and terminates when one of the following occurs:

- ✓ A COMMIT or ROLLBACK statement is issued
- ✓ A DDL statement, such as CREATE, is issued
- ✓ A DCL statement is issued
- ✓ The user exits SQL*Plus
- ✓ A machine fails or the system crashes

After one transaction ends, the next executable SQL statement automatically starts the next transaction. A DDL or DCL statement is automatically committed and therefore implicitly ends a transaction.

Transaction Control

- COMMIT: Ends the current transaction by making all pending data changes permanent.
- ROLLBACK: Ends the current transaction by discarding all pending data changes.
- SAVEPOINT: Marks a savepoint within the current transaction.

Example
To create a new advertising department with at least one employee and make the data changes permanent.

```
INSERT INTO dept (deptno, dname, loc)
VALUES (50, 'ADVERTISING', 'ATLANTA');
UPDATE EMP
SET DEPTNO = 50
WHERE EMPNO = 7566;
COMMIT;
```

ACTIVITY

1. Write a transaction to insert following rows in EMP table.

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7123	RALPH	DESIGNER	7566	21-APR-85	2300		50
7890	GEORGE	CLERK	7566	03-MAY-85	1235		50
7629	BOB	SALESMAN	7698	06-MAR-86	1800	1000	30

2. Write down SQL statements to perform following functions:-
   Increase the salary by 250 of all clerks with a salary less than 900.

- ✓ Transfer the employee with number 7890 to department 20 and increase his salary by 15%.
- ✓ Increase the salary of employee with number 7369 by 10% of the salary of employee with number 7499.
- ✓ Assign to employee 7876 the same manager as the employee 7900.
- ✓ Display deptno from the table employee avoiding the duplicated values.

3.Remove all employees who were hired before 1981.

- ✓ Create a save point in sql.(s1)
- ✓ Now delete all the records from emp where deptno is 30.
- ✓ Create another savepoint in sql(s2)
- ✓ Now delete all the records from emp table where deptno is 20.
- ✓ Create another save point.
- ✓ Now roll back to save point s1

BEST OF LUCK