Aim: DML Commands, TCL and DCL Commands

Software Used

- **Server:** Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64bit Production With the Partitioning, OLAP, Data Mining and Real Application Testing options
- **Client :** SQL*Plus: Release 9.0.1.3.0

Data Manipulation Language (DML)

- INSERT - Used for inserting data.
- UPDATE- Used for modifying data.
- DELETE- Used for deleting data.

Note: DML statement s are temporary, not permanent, the operations effect only that particular session, not the other sessions which are open simultaneously

Left hand side of the record

Right hand side of the record

INSERT

Syntax:

INSERT INTO
<TableName>(<ColumnName1>,<ColumnName2>…)
VALUES (<expression1>,<expression2>,…);

Example:

INSERT INTO STUDENT(Rollno, Age) VALUES (1,30);

Syntax:

INSERT INTO <TableName>
VALUES (<expression1>,<expression2>,…);

Example:

INSERT INTO STUDENT VALUES (1,'ABC',30);

Syntax:

INSERT INTO <TableName>
VALUES (<&expression1>,<&expression2>,…);

Example:

INSERT INTO STUDENT VALUES (&Rollno, '&SName', &age);

Result-1:

1 row created

Result-2:

1 row created

Result-3:

```
Enter value for sid: 31
Enter value for sname: Lubber
Enter value for rating: 8
Enter value for age: 55.5
old   1: INSERT INTO sailors  VALUES (&sid, '&sname', &rating,
           &age)
new   1: INSERT INTO sailors  VALUES (31, 'Lubber', 8, 55.5)

1 row created.

SQL> /
Enter value for sid: 32
Enter value for sname: Andy
Enter value for rating: 8
Enter value for age: 25.5
old   1: INSERT INTO sailors  VALUES (&sid, '&sname', &rating, &age)
new   1: INSERT INTO sailors  VALUES (32, 'Andy', 8, 25.5)

1 row created.

SQL> /

10 rows inserted
```

Exercise:

Insert the following data into sailors table

Sid	Sname	Rating	Age
22	Dustin	7	45
29	Brutus	1	33
31	Lubber	8	55.5
32	Andy	8	25.5
58	Rusty	10	35
64	Horatio	7	35
71	Zorba	10	16
74	Horatio	9	40
85	Art	3	25.5
95	Bob	3	63.5

Query:

1. INSERT INTO sailors (SID, SNAME, RATING, AGE)
   VALUES (22, 'Dustin', 7, 45.0);

2. INSERT INTO sailors VALUES (29, 'Brutus', 1, 33.0);

3. INSERT INTO sailors VALUES (&sid, '&sname', &rating,
   &age);

Result:

```
Enter value for bid: 101
Enter value for bname: Interlake
Enter value for color: blue
old   1: INSERT INTO boats VALUES (&bid, '&bname', '&color')
new   1: INSERT INTO boats VALUES (101, 'Interlake', 'blue')

1 row created.

SQL> /

5 rows created


Enter value for sid: 22
Enter value for bid: 101
old   1: INSERT INTO reserves VALUES (&sid, &bid, '01-JAN-98')
new   1: INSERT INTO reserves VALUES (22, 101, '01-JAN-98')

1 row created.


SQL> /

10 rows created.
```

Boats

bid	bname	color
101	Interlake	blue
102	Interlake	red
103	Clipper	green
104	Marine	red
105	SeaBird	blue

Query :

INSERT INTO boats VALUES (&bid, '&bname', '&color');

Reserves

sid	bid	day
22	101	01-JAN-98
22	102	01-JAN-98
22	103	01-JAN-98
22	104	01-JAN-98
31	102	01-JAN-98
31	103	01-JAN-98
31	104	01-JAN-98
64	101	01-JAN-98
64	102	01-JAN-98
74	103	01-JAN-98

Query :

INSERT INTO reserves VALUES (&sid, &bid, '01-JAN-98');

Result:

10 rows updated.

SQL> SELECT * FROM reserves;

SID	BID	DAY
22	101	
22	102	
22	103	
22	104	
31	102	
31	103	
31	104	
64	101	
64	102	
74	103	

UPDATE

Syntax:

UPDATE <table_name>

SET <column1>=<Val1>[, <column2>=<Val2>,…]

[WHERE <conditions>];

Exercise:

Update all the rows of the table **Reserves**, such that the data in the **Day** column is empty

Query:

UPDATE reserves SET day=NULL;

Result:

```
Enter value for day: 10-OCT-98
Enter value for sid: 22
Enter value for bid: 101
old   1:  UPDATE reserves SET day='&day' WHERE sid=&sid AND
          bid=&bid
new   1: UPDATE reserves SET day='10-OCT-98' WHERE sid=22
           AND bid=101

1 row updated.


SQL>  /
Enter value for day: 08-OCT-98
Enter value for sid: 22
Enter value for bid: 103
old   1: UPDATE reserves SET day='&day' WHERE sid=&sid AND
        bid=&bid
new   1: UPDATE reserves SET day='08-OCT-98' WHERE sid=22
        AND bid=103

1 row updated.

.
.
10 rows updated
```

Exercise:

Update all the rows of the table **Reserves**, such that the Day column has the values given in the table below

sid	bid	day
22	101	10-OCT-98
22	102	10-OCT-98
22	103	08-OCT-98
22	104	07-OCT-98
31	102	10-NOV-98
31	103	06-NOV-98
31	104	12-NOV-98
64	101	05-SEP-98
64	102	08-SEP-98
74	103	08-SEP-98

Query:

```
UPDATE reserves SET day='&day' WHERE sid=&sid AND
bid=&bid;
```

Result-1:
10 rows deleted.

SQL> SELECT * FROM reserves;

no rows selected

Result-2:
2 rows deleted.

SQL> SELECT * FROM boats;

BID	BNAME	COLOR
101	Interlake	blue
103	Clipper	green

Result-3:
4 rows deleted.

SQL> SELECT * FROM sailors;

SID	SNAME	RATING	AGE
22	Dustin	7	45
29	Brutus	1	33
31	Lubber	8	55.5
64	Horatio	7	35
85	Art	3	25.5
95	Bob	3	63.5

DELETE

Syntax:

DELETE FROM <TableName> WHERE <conditions>;

Exercise:

1. Delete all the rows from the reserves table
2. Delete all the boats which are in ‘red’ color
3. Delete all the sailors who have rating>7 and age<50

Query:

1. DELETE FROM reserves;
2. DELETE FROM boats WHERE color=‘red’;
3. DELETE FROM sailors WHERE rating>7 AND age<50;

TRUNCATE

Used to delete all records in a table permanently(it is auto-commit) but retains the structure of the table, where clause cannot be used with truncate.

Syntax:

TRUNCATE TABLE <TableName> ;

Example:

TRUNCATE TABLE Student;

Result: (write it on the left side of the page)

Table truncated.

Example:

```
INSERT INTO sailors VALUES (100,'RAM',8,20);
1 row inserted.
SAVEPOINT a;
Savepoint created;

INSERT INTO boats VALUES (108, 'Titanic', 'blue');
1 row inserted.
SAVEPOINT b;
Savepoint created;

UPDATE boats SET color='black WHERE bid=108;
1 row updated.
ROLLBACK TO b;
Rollback complete.

ROLLBACK TO a;
Rollback complete.

COMMIT;
Commit complete.
```

Transaction Control Language (TCL)

- COMMIT – Used to permanently save any transaction into Database (DML statements)
  Syntax: COMMIT;

- ROLLBACK- restores the database to last committed state. It is also use with savepoint command to jump to a savepoint in a transaction.
  Syntax: ROLLBACK; (or)
  ROLLBACK TO <savepoint-name>;

- SAVEPOINT- used to temporarily save a transaction so that you can rollback to that point whenever necessary.
  Syntax: SAVEPOINT <savepoint-name>;

Example:

Logged in as it13737001

GRANT ALL ON sailors TO it13737005, it13737008;
Grant succeeded.

GRANT SELECT,UPDATE ON sailors TO it13737006;
Grant succeeded.

GRANT ALL ON sailors TO it13737007 WITH GRANT OPTION;
Grant succeeded.

REVOKE ALL ON sailors FROM it13737008;
Revoke succeeded.

Logged in as it13737005
SELECT * FROM it13737001. sailors;
ALTER TABLE it13737001. sailors ADD….

Logged in as it13737006
SELECT * FROM it13737001. sailors;

Logged in as it13737007
GRANT SELECT,UPDATE ON it13737001. sailors TO it13737008;
Grant succeeded.

Data Control Language (DCL)

1. GRANT – Gives user access privileges to database

Syntax: GRANT <object_privileges>
ON <object_name>
TO <user_name>
[WITH GRANT OPTION];

Object Privileges:

ALTER, DELETE, INDEX, SELECT, INSERT, UPDATE

Object Name: table/view/package… on which the permission is being granted

User Name: the user to whom the permission is being given

Grant Option: allows the grantee to in turn grant object privileges to other users

2. REVOKE: Used to deny the GRANT given on an object.

Syntax:

REVOKE <object_privileges>

ON <object_name>

FROM <username>;

SELECT (Viewing Data/Data Retrieval)

- Syntax: Simple Select

```
SELECT [DISTINCT]    select_list
FROM                 from_list
WHERE                qualification
ORDER BY             asc/desc;
```

Wild cards in Oracle:

_ (underscore) : one and only one character

% : one or more characters or Spaces

Note: It is a must to use the 'like' operator when a wildcard is used, = should not be used.

Result:

SNAME	RATING
Lubber	8
Andy	8
Rusty	10
Zorba	10
Horatio	9

Result:
Table created.

SQL> Select * from sailors_copy;

SID	SNAME	RATING	AGE
22	Dustin	7	45
29	Brutus	1	33
31	Lubber	8	55.5
32	Andy	8	25.5
58	Rusty	10	35
64	Horatio	7	35
71	Zorba	10	16
74	Horatio	9	35
85	Art	3	25.5
95	Bob	3	63.5

10 rows selected.

Exercise:

1. Find all sailors with a rating above 7

Query:

SELECT sname, rating FROM sailors WHERE rating>7;

2. Create a table sailors_copy which is a copy of the table sailors.

Query:

CREATE TABLE sailors_copy AS SELECT * FROM sailors;

Result:

Table created.

```
SQL> Select * from  boats_copy;
no rows selected.

SQL> desc boats_copy
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------
 BID                                                NUMBER(5)
 BNAME                                              VARCHAR2(20)
 COLOR                                              VARCHAR2(10)
```

Result:

SNAME	RATING	AGE
Dustin	7	45
Brutus	1	33
Lubber	8	55.5
Andy	8	25.5
Rusty	10	35
Horatio	7	35
Horatio	9	35
Art	3	25.5
Bob	3	63.5

9 rows selected.

Exercise:

3. Create a table boats_copy which has the same structure as the table boats, but not the data.

Query:

```
CREATE TABLE boats_copy AS SELECT * FROM boats
WHERE 1=2;
```

4. Find all sailors whose rating is less than 8 or age is greater than 25

Query:

```
SELECT sname,rating,age FROM sailors WHERE rating<8
OR age>25;
```

Follow the same format for rest of the queries in the exercise:

5. Find all the boats that have been reserved by Sailor number 22
6. Find all the boats with the name ‘Interlake’
7. Find the names of all the boats that are blue in color
8. Find all the boats that have been reserved in the month of October
9. Find all the sailors whose name starts with ‘a’ or ‘A’
10. Find all the boats whose name end with ‘e’ or ’E’
11. Find all the Sailors whose name has exactly 3 characters
12. Find all boats whose name has ‘n’ as its 2nd character

Viva questions

1. What are the various kinds of interactions catered by DBMS?
2. What are the features of Database language?
3. What do database languages do?
4. Define database model?
5. What is SQL?
6. Enlist the various relationships of database.
7. Define DDL and DML
8. Enlist some commands of DML?
9. Write the syntax of alter,drop?
10. What is the difference between DELETE and TRUNCATE statements?

Text books

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, Database System Concepts, 6th Edition, McGraw-Hill International Edition, 2010.
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill International Edition, 2003.
3. Elmasri, Navathe, Somayajulu and Gupta, Fundamentals of Database System, 6 th Edition, Pearson Education, 2011.
4. Patric O'Neil, Elizabeth O'Neil, Database-principles, programming, andperformance,Morgan Kaufmann Publishers, 2001.

Web References

- https://www.javatpoint.com/sql-interview-questions
- https://www.sanfoundry.com/oracle-sql-mcqs-dml-command/

Video Links

- https://www.youtube.com/watch?v=RWPgInu5uko
- https://www.youtube.com/watch?v=w1XdPholzWY