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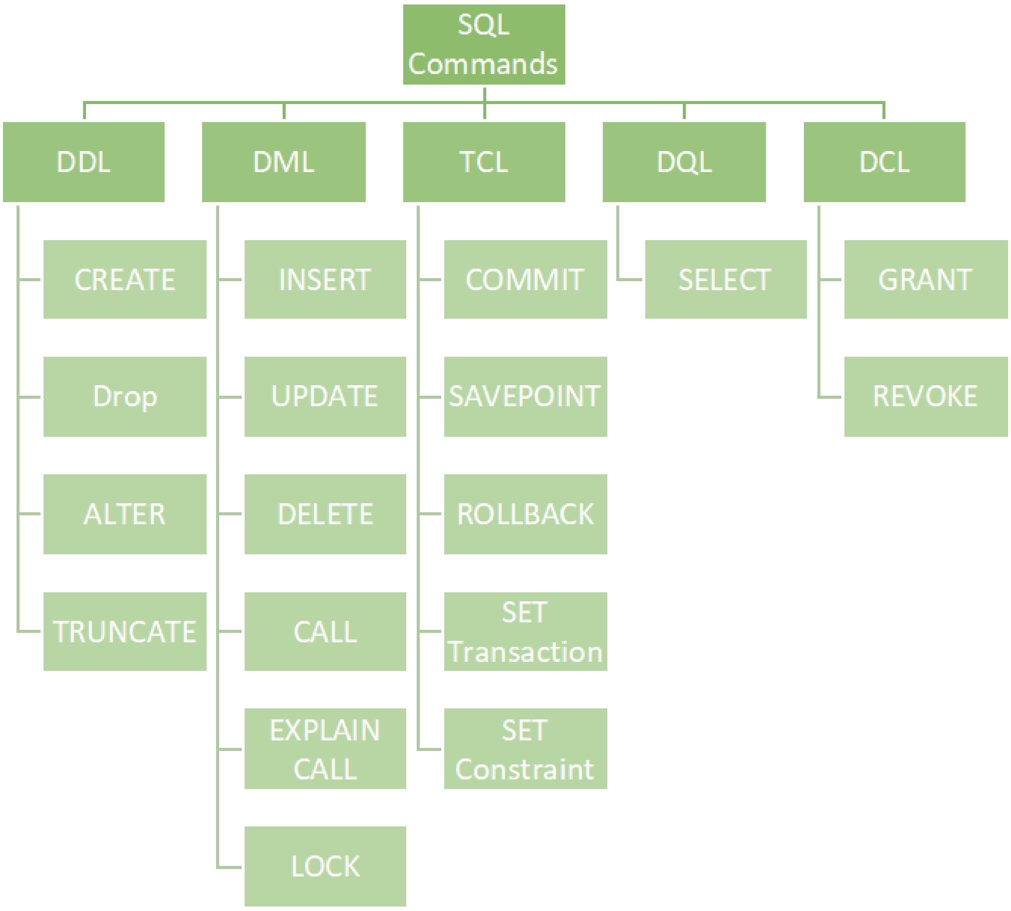
Structured Query Language(SQL) as we all know is the database language by the use of which we can perform certain operations on the existing database and also we can use this language to create a database. SQL uses certain commands like Create, Drop, Insert, etc. to carry out the required tasks.

These SQL commands are mainly categorized into four categories as:

1. DDL – Data Definition Language
2. DQl – Data Query Language/ DRL Data Retrieval Language
3. DML – Data Manipulation Language
4. DCL – Data Control Language

Though many resources claim there to be another category of SQL clauses **TCL – Transaction Control Language**. So we will see in detail about TCL as well.



DDL (Data Definition Language):

DDL or Data Definition Language actually consists of the SQL commands that can be used to define the database schema. It simply deals with

descriptions of the database schema and is used to create and modify the structure of database objects in the database. DDL is a set of SQL commands used to create, modify, and delete database structures but not data. These commands are normally not used by a general user, who should be accessing the database via an application.
List of DDL commands:

- **CREATE**: This command is used to create the database or its objects (like table, index, function, views, store procedure, and triggers).
- **DROP**: This command is used to delete objects from the database.
- **ALTER:** This is used to alter the structure of the database.
- **TRUNCATE:** This is used to remove all records from a table, including all spaces allocated for the records are removed.
- **COMMENT**: This is used to add comments to the data dictionary.
- **RENAME:** This is used to rename an object existing in the database.

DQL (Data Query Language): Data Retrieval language.

DQL statements are used for performing queries on the data within schema objects. The purpose of the DQL Command is to get some schema relation based on the query passed to it. We can define DQL as follows it is a component of SQL statement that allows getting data from the database and imposing order upon it. It includes the SELECT statement. This command allows getting the data out of the database to perform operations with it. When a SELECT is fired against a table or tables the result is compiled into a further temporary table, which is displayed or perhaps received by the program i.e. a front-end.
List of DQL:

- **SELECT:** It is used to retrieve data from the database.

DML(Data Manipulation Language):

The SQL commands that deals with the manipulation of data present in the database belong to DML or Data Manipulation Language and this includes most of the SQL statements. It is the component of the SQL statement that controls access to data and to the database. Basically, DCL statements are grouped with DML statements.

List of DML commands:

- **INSERT** : It is used to insert data into a table.
- **UPDATE:** It is used to update existing data within a table.
- **DELETE** : It is used to delete records from a database table.
- **LOCK:** Table control concurrency.
- **CALL:** Call a PL/SQL or JAVA subprogram.
- **EXPLAIN PLAN:** It describes the access path to data.

DCL (Data Control Language):

DCL includes commands such as GRANT and REVOKE which mainly deal with the rights, permissions, and other controls of the database system.

List of DCL commands:

- **GRANT:** This command gives users access privileges to the database.
- **REVOKE:** This command withdraws the user’s access privileges given by using the GRANT command.

Though many resources claim there to be another category of SQL clauses TCL – Transaction Control Language. So we will see in detail about TCL as well. TCL commands deal with the transaction within the database.
List of TCL commands:

- **COMMIT:** Commits a Transaction.
- **ROLLBACK:** Rollbacks a transaction in case of any error occurs.
- **SAVEPOINT:**Sets a savepoint within a transaction.
- **SET TRANSACTION:** Specify characteristics for the transaction.

https://www.oracle.com/database/technologies/xe-prior-release-downloads.html

https://youtu.be/seFRL1GAzLY

https://www.testingdocs.com/download-install-mysql-on-windows-11/

https://dev.mysql.com/downloads/installer/

https://youtu.be/eq-e_n7lm2M

https://www.youtube.com/watch?v=WuBcTJnIuzo

https://www.youtube.com/watch?v=wEHWYuzP7VE

DDL:-

CREATE TABLE

```
Create table tablename(
column1 datatype,
column2 datatype,
column3 datatype,
);
```

```
1.CREATE TABLE   customers
( customer_id number(10) NOT NULL,
 customer_name varchar2(50) NOT NULL,
 city varchar2(50)
```

DROP TABLE:

DROP TABLE *table_name*;

DROP TABLE studentinfo;

TRUNCATE TABLE:

TRUNCATE TABLE *table_name*;

TRUNCATE TABLE studentinfo;

ALTER TABLE:

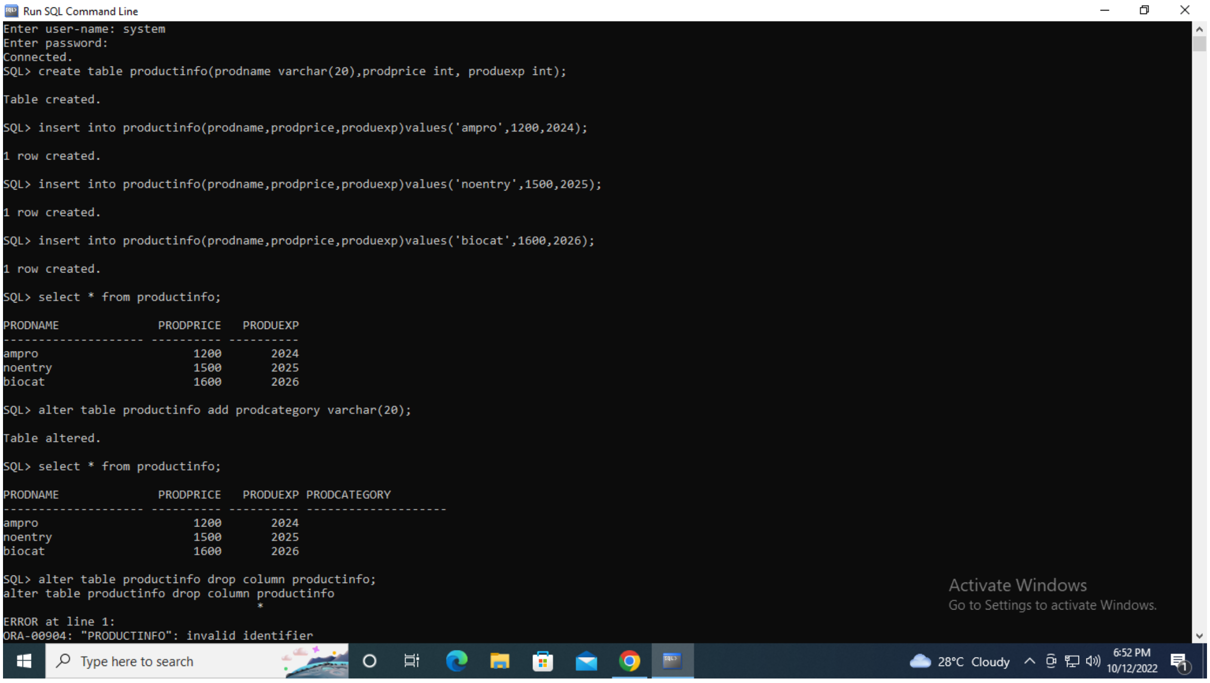
ALTER TABLE *table_name*
ADD *column_name datatype*;

ALTER TABLE Customers
ADD Email varchar(255);

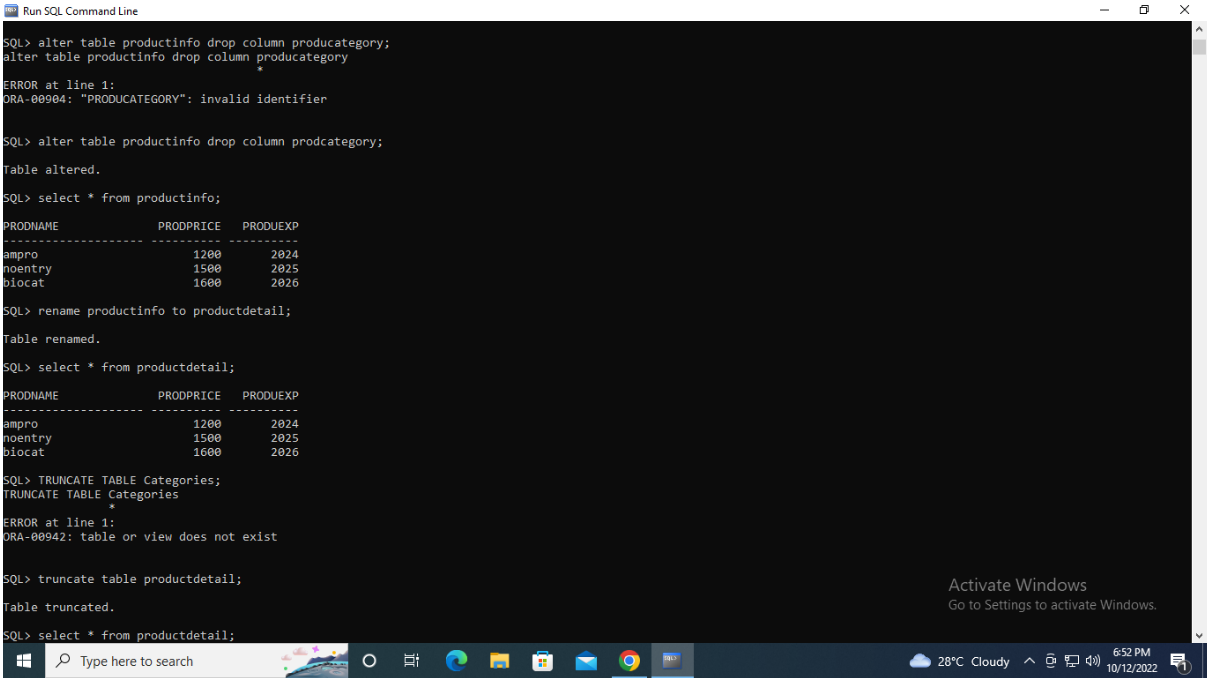
Rename :

RENAME old_table_name To new_table_name;

RENAME Cars To Car_2021_Details ;



```
Enter user-name: system
Enter password:
Connected.
SQL> create table productinfo(prodname varchar(20),prodprice int, produexp int);

Table created.

SQL> insert into productinfo(prodname,prodprice,produexp)values('ampro',1200,2024);

1 row created.

SQL> insert into productinfo(prodname,prodprice,produexp)values('noentry',1500,2025);

1 row created.

SQL> insert into productinfo(prodname,prodprice,produexp)values('biocat',1600,2026);

1 row created.

SQL> select * from productinfo;

PRODNAME              PRODPRICE   PRODUEXP
-------------------- ---------- ----------
ampro                      1200       2024
noentry                    1500       2025
biocat                     1600       2026

SQL> alter table productinfo add prodcategory varchar(20);

Table altered.

SQL> select * from productinfo;

PRODNAME              PRODPRICE   PRODUEXP PRODCATEGORY
-------------------- ---------- ---------- --------------------
ampro                      1200       2024
noentry                    1500       2025
biocat                     1600       2026

SQL> alter table productinfo drop column productinfo;
alter table productinfo drop column productinfo
                                    *
ERROR at line 1:
ORA-00904: "PRODUCTINFO": invalid identifier
```



```
SQL> alter table productinfo drop column producategory;
alter table productinfo drop column producategory
                                    *
ERROR at line 1:
ORA-00904: "PRODUCATEGORY": invalid identifier


SQL> alter table productinfo drop column prodcategory;

Table altered.

SQL> select * from productinfo;

PRODNAME              PRODPRICE   PRODUEXP
-------------------- ---------- ----------
ampro                      1200       2024
noentry                    1500       2025
biocat                     1600       2026

SQL> rename productinfo to productdetail;

Table renamed.

SQL> select * from productdetail;

PRODNAME              PRODPRICE   PRODUEXP
-------------------- ---------- ----------
ampro                      1200       2024
noentry                    1500       2025
biocat                     1600       2026

SQL> TRUNCATE TABLE Categories;
TRUNCATE TABLE Categories
               *
ERROR at line 1:
ORA-00942: table or view does not exist


SQL> truncate table productdetail;

Table truncated.

SQL> select * from productdetail;
```

DML:-

INSERT INTO TABLE_NAME (column_Name1 , column_Name2 , column_Name3 , ... column_NameN) **VALUES** (value_1, value_2, value_3, ... value_N) ;

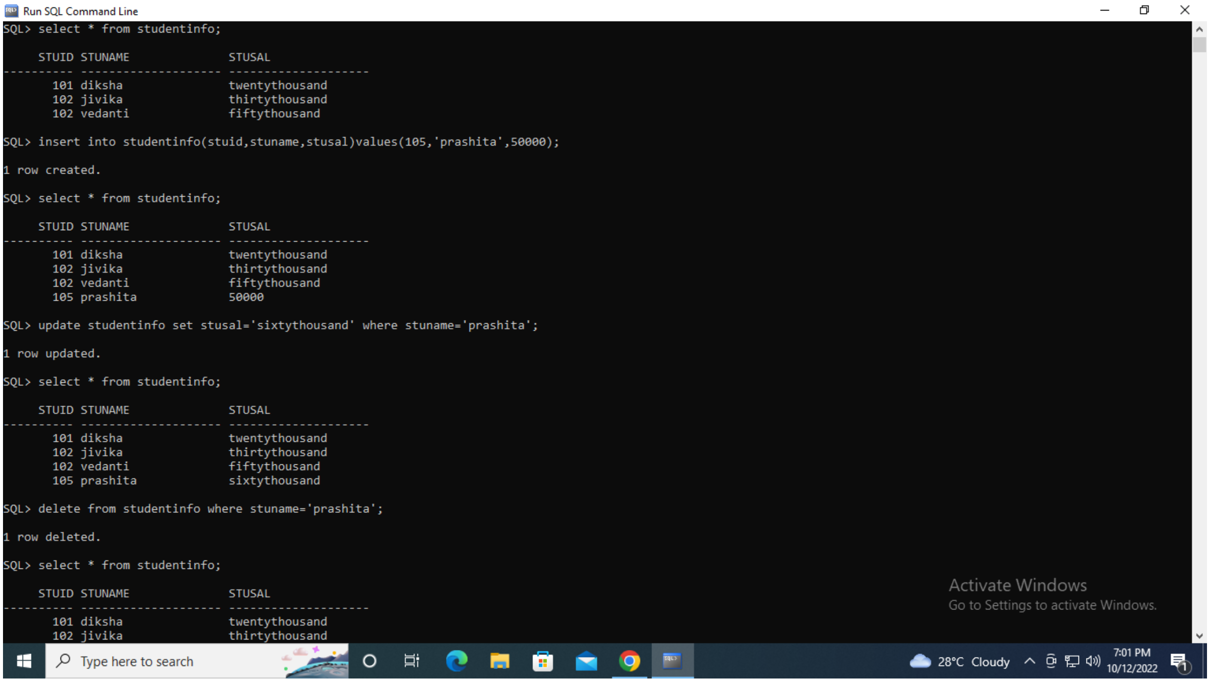
INSERT INTO Student (Stu_id, Stu_Name, Stu_Marks, Stu_Age) **VALUES** (104, Anmol, 89, 19);

UPDATE Table_name **SET** [column_name1= value_1, ….., column_nameN = value_N] **WHERE** CONDITION;

UPDATE Table_name **SET** [column_name1= value_1, ….., column_nameN = value_N] **WHERE** CONDITION;

DELETE FROM Table_Name **WHERE** condition;

DELETE FROM Product **WHERE** Product_Id = 'P202' ;



```
SQL> select * from studentinfo;

     STUID STUNAME                STUSAL
---------- -------------------- --------------------
       101 diksha               twentythousand
       102 jivika               thirtythousand
       102 vedanti              fiftythousand

SQL> insert into studentinfo(stuid,stuname,stusal)values(105,'prashita',50000);

1 row created.

SQL> select * from studentinfo;

     STUID STUNAME                STUSAL
---------- -------------------- --------------------
       101 diksha               twentythousand
       102 jivika               thirtythousand
       102 vedanti              fiftythousand
       105 prashita             50000

SQL> update studentinfo set stusal='sixtythousand' where stuname='prashita';

1 row updated.

SQL> select * from studentinfo;

     STUID STUNAME                STUSAL
---------- -------------------- --------------------
       101 diksha               twentythousand
       102 jivika               thirtythousand
       102 vedanti              fiftythousand
       105 prashita             sixtythousand

SQL> delete from studentinfo where stuname='prashita';

1 row deleted.

SQL> select * from studentinfo;

     STUID STUNAME                STUSAL
---------- -------------------- --------------------
       101 diksha               twentythousand
       102 jivika               thirtythousand
```

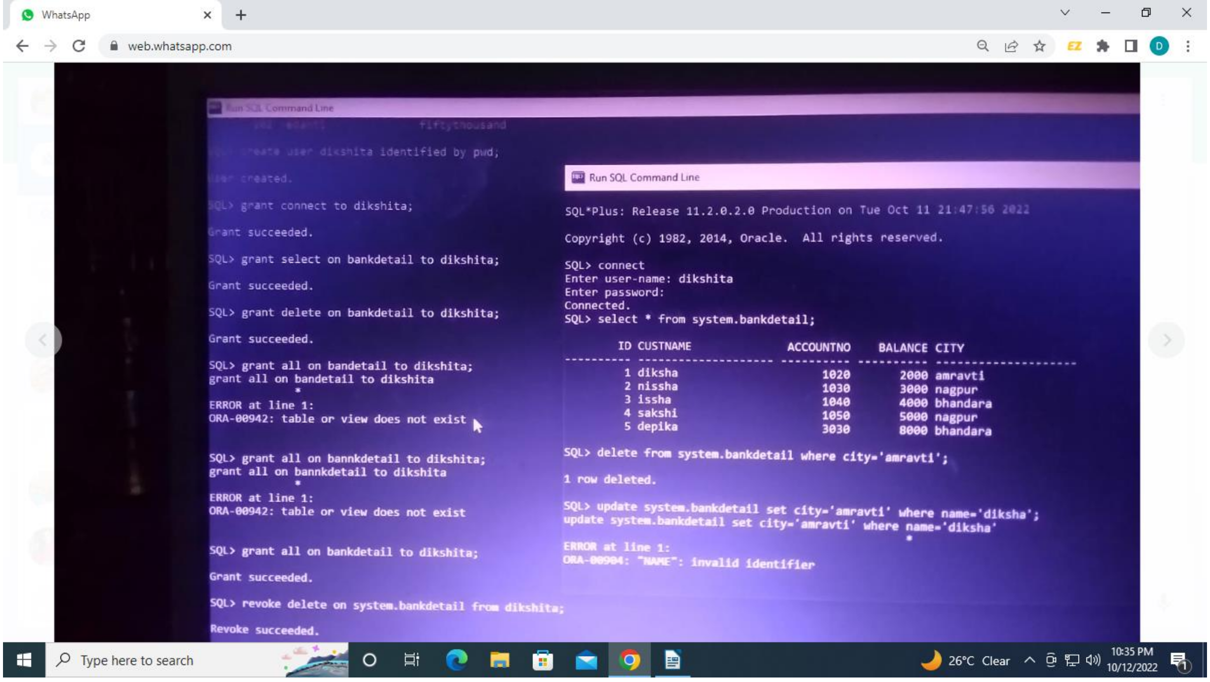
DCL:

Grant:

GRANT SELECT, UPDATE ON MY_TABLE TO SOME_USER,ANOTHER_USER;

Revoke:

REVOKE SELECT, UPDATE ON MY_TABLE FROM USER1, USER2;



```
       102 vedanti              fiftythousand

SQL> create user dikshita identified by pwd;

User created.

SQL> grant connect to dikshita;

Grant succeeded.

SQL> grant select on bankdetail to dikshita;

Grant succeeded.

SQL> grant delete on bankdetail to dikshita;

Grant succeeded.

SQL> grant all on bandetail to dikshita;
grant all on bandetail to dikshita
             *
ERROR at line 1:
ORA-00942: table or view does not exist


SQL> grant all on bannkdetail to dikshita;
grant all on bannkdetail to dikshita
             *
ERROR at line 1:
ORA-00942: table or view does not exist


SQL> grant all on bankdetail to dikshita;

Grant succeeded.

SQL> revoke delete on system.bankdetail from dikshita;

Revoke succeeded.
```

```
SQL*Plus: Release 11.2.0.2.0 Production on Tue Oct 11 21:47:56 2022

Copyright (c) 1982, 2014, Oracle.  All rights reserved.

SQL> connect
Enter user-name: dikshita
Enter password:
Connected.
SQL> select * from system.bankdetail;

        ID CUSTNAME              ACCOUNTNO    BALANCE CITY
---------- -------------------- ---------- ---------- --------------------
         1 diksha                     1020       2000 amravti
         2 nissha                     1030       3000 nagpur
         3 issha                      1040       4000 bhandara
         4 sakshi                     1050       5000 nagpur
         5 depika                     3030       8000 bhandara

SQL> delete from system.bankdetail where city='amravti';

1 row deleted.

SQL> update system.bankdetail set city='amravti' where name='diksha';
update system.bankdetail set city='amravti' where name='diksha'
                                                  *
ERROR at line 1:
ORA-00904: "NAME": invalid identifier
```

TCL :

COMMIT;

ex: DELETE FROM CUSTOMERS

WHERE AGE= 25;

COMMIT;

ROLLBACK;

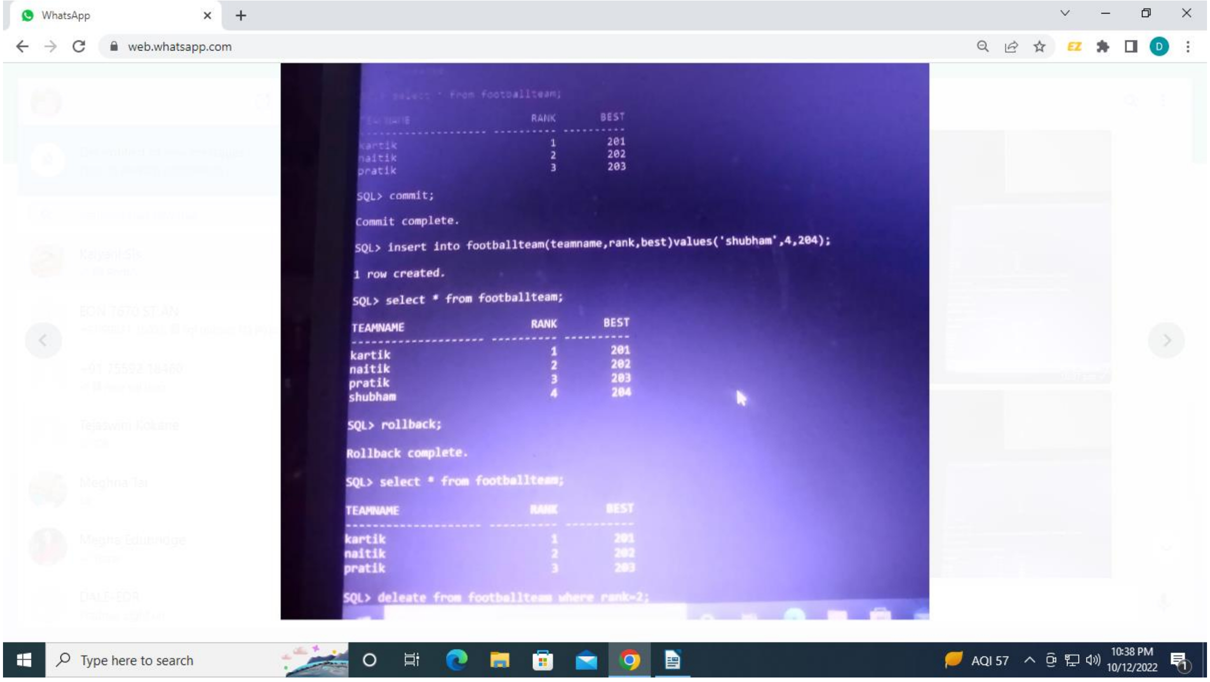
ex: DELETE FROM CUSTOMERS

WHERE AGE= 25;

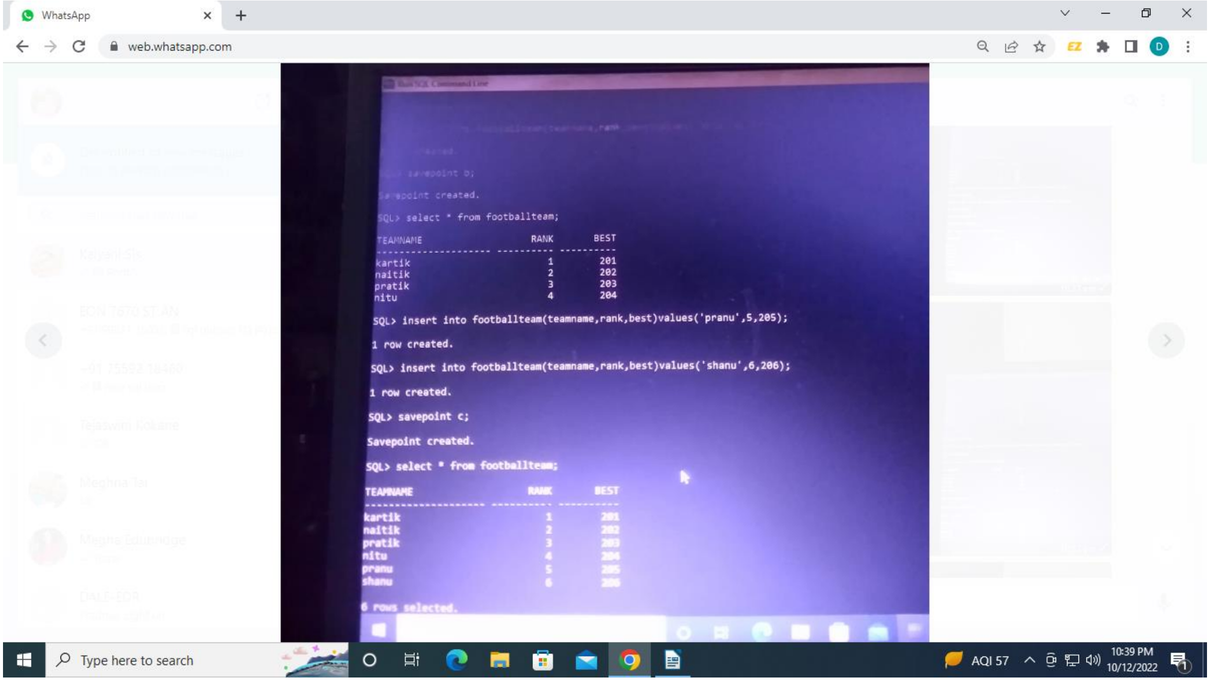
COMMIT;

SAVEPOINT :

SAVEPOINT SAVEPOINT_NAME;



```
SQL> select * from footballteam;

TEAMNAME                 RANK       BEST
-------------------- ---------- ----------
kartik                      1        201
naitik                      2        202
pratik                      3        203

SQL> commit;

Commit complete.

SQL> insert into footballteam(teamname,rank,best)values('shubham',4,204);

1 row created.

SQL> select * from footballteam;

TEAMNAME                 RANK       BEST
-------------------- ---------- ----------
kartik                      1        201
naitik                      2        202
pratik                      3        203
shubham                     4        204

SQL> rollback;

Rollback complete.

SQL> select * from footballteam;

TEAMNAME                 RANK       BEST
-------------------- ---------- ----------
kartik                      1        201
naitik                      2        202
pratik                      3        203

SQL> deleate from footballteam where rank=2;
```



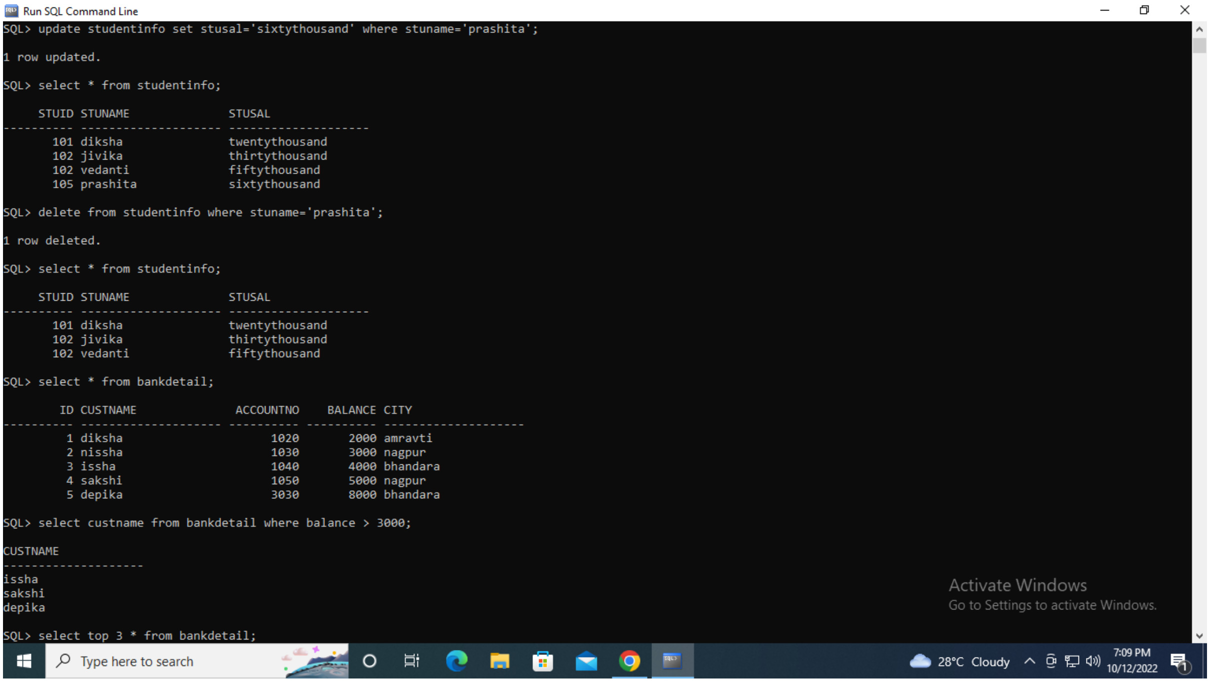
```
SQL> savepoint b;

Savepoint created.

SQL> select * from footballteam;

TEAMNAME                   RANK       BEST
-------------------- ---------- ----------
kartik                        1        201
naitik                        2        202
pratik                        3        203
nitu                          4        204

SQL> insert into footballteam(teamname,rank,best)values('pranu',5,205);

1 row created.

SQL> insert into footballteam(teamname,rank,best)values('shanu',6,206);

1 row created.

SQL> savepoint c;

Savepoint created.

SQL> select * from footballteam;

TEAMNAME                   RANK       BEST
-------------------- ---------- ----------
kartik                        1        201
naitik                        2        202
pratik                        3        203
nitu                          4        204
pranu                         5        205
shanu                         6        206

6 rows selected.
```

DQL :

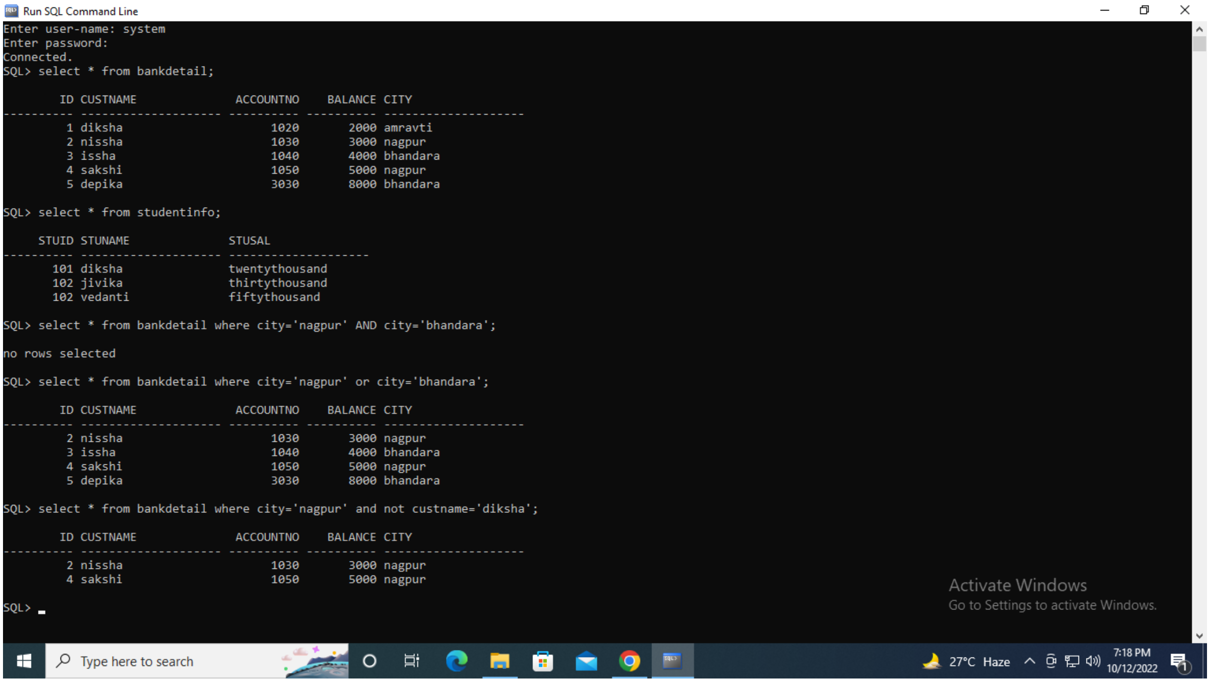
SELECT expressions

1.FROM TABLES

2.WHERE conditions;



```
SQL> update studentinfo set stusal='sixtythousand' where stuname='prashita';

1 row updated.

SQL> select * from studentinfo;

     STUID STUNAME              STUSAL
---------- -------------------- --------------------
       101 diksha               twentythousand
       102 jivika               thirtythousand
       102 vedanti              fiftythousand
       105 prashita             sixtythousand

SQL> delete from studentinfo where stuname='prashita';

1 row deleted.

SQL> select * from studentinfo;

     STUID STUNAME              STUSAL
---------- -------------------- --------------------
       101 diksha               twentythousand
       102 jivika               thirtythousand
       102 vedanti              fiftythousand

SQL> select * from bankdetail;

        ID CUSTNAME              ACCOUNTNO    BALANCE CITY
---------- -------------------- ---------- ---------- --------------------
         1 diksha                     1020       2000 amravti
         2 nissha                     1030       3000 nagpur
         3 issha                      1040       4000 bhandara
         4 sakshi                     1050       5000 nagpur
         5 depika                     3030       8000 bhandara

SQL> select custname from bankdetail where balance > 3000;

CUSTNAME
--------------------
issha
sakshi
depika

SQL> select top 3 * from bankdetail;
```



```
Enter user-name: system
Enter password:
Connected.
SQL> select * from bankdetail;

        ID CUSTNAME              ACCOUNTNO    BALANCE CITY
---------- -------------------- ---------- ---------- --------------------
         1 diksha                     1020       2000 amravti
         2 nissha                     1030       3000 nagpur
         3 issha                      1040       4000 bhandara
         4 sakshi                     1050       5000 nagpur
         5 depika                     3030       8000 bhandara

SQL> select * from studentinfo;

     STUID STUNAME              STUSAL
---------- -------------------- --------------------
       101 diksha               twentythousand
       102 jivika               thirtythousand
       102 vedanti              fiftythousand

SQL> select * from bankdetail where city='nagpur' AND city='bhandara';

no rows selected

SQL> select * from bankdetail where city='nagpur' or city='bhandara';

        ID CUSTNAME              ACCOUNTNO    BALANCE CITY
---------- -------------------- ---------- ---------- --------------------
         2 nissha                     1030       3000 nagpur
         3 issha                      1040       4000 bhandara
         4 sakshi                     1050       5000 nagpur
         5 depika                     3030       8000 bhandara

SQL> select * from bankdetail where city='nagpur' and not custname='diksha';

        ID CUSTNAME              ACCOUNTNO    BALANCE CITY
---------- -------------------- ---------- ---------- --------------------
         2 nissha                     1030       3000 nagpur
         4 sakshi                     1050       5000 nagpur

SQL> _
```

INNER JOIN

1.**SELECT** columns

2.**FROM** table1

3.**INNER** JOIN table2

4.**ON** table1.**column** = table2.**column**;

OUTER JOIN

Left Outer Join

1.**SELECT** columns

2.**FROM** table1

3.LEFT [OUTER] JOIN table2

4.**ON** table1.**column** = table2.**column**;

Right Outer Join

SELECT columns

1.**FROM** table1

```
2.RIGHT [OUTER] JOIN table2
3.ON table1.column = table2.column;
```

Full Outer Join

```
SELECT columns

1.FROM table1
2.FULL [OUTER] JOIN table2
3.ON table1.column = table2.column;
```

AND Syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 AND condition2 AND condition3 ...;
```

OR Syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE condition1 OR condition2 OR condition3 ...;
```

NOT Syntax

```
SELECT column1, column2, ...
FROM table_name
WHERE NOT condition;
```

GROUP BY

```
SELECT column_name(s)
FROM table_name
WHERE condition
GROUP BY column_name(s)
ORDER BY column_name(s);
```

HAVING Clause

```
SELECT column_name(s)
FROM table_name
WHERE condition
GROUP BY column_name(s)
HAVING condition
ORDER BY column_name(s);
```

MIN() and MAX()

MIN() Syntax

```
SELECT MIN(column_name)
FROM table_name
WHERE condition;
```

MAX() Syntax

```
SELECT MAX(column_name)
FROM table_name
WHERE condition;
```

MIN() Example

```
SELECT MIN(Price) AS SmallestPrice
FROM Products;
```

MAX() Example

```
SELECT MAX(Price) AS LargestPrice
FROM Products;
```