SQL Structured Query Language

SQL is a standard language for storing, manipulating and retrieving data in databases.

What is SQL?

- SQL stands for Structured Query Language
- SQL lets you access and manipulate databases
- **SQL became a standard of the American National Standards Institute (ANSI) in 1986, and of the International Organization for Standardization (ISO) in 1987**

What Can SQL do?

- SQL can execute queries against a database
- SQL can retrieve data from a database
- SQL can insert records in a database
- SQL can update records in a database
- SQL can delete records from a database
- SQL can create new databases
- SQL can create new tables in a database
- SQL can create stored procedures in a database
- SQL can create views in a database
- SQL can set permissions on tables, procedures, and views

SQL is not a database system, but it is a query language.

Suppose you want to perform the queries of SQL language on the stored data in the database. You are required to install any database management system in your systems, for example, **Oracle, MySQL, PostgreSQL, SQL Server, DB2**, etc

Oracle DB

Oracle Corporation is the largest software company to develop and markets computer software applications for business. The company is best known for its Oracle database products and, more recently, cloud products and services

Oracle database is a relational database management system. It is also called **OracleDB**, or simply **Oracle**. It is produced and marketed by **Oracle Corporation**. It was created in **1977** by **Lawrence Ellison** and other engineers. It is one of the most popular relational database engines

- Oracle is a relational database management system. It is widely used in enterprise applications.
- Oracle database such as insert record, update record, delete record, select record, create table, drop table etc.

Oracle Data Types

Oracle String data types

CHAR(size)	It is used to store character data within the predefined length. It can be stored up to 2000 bytes.
NCHAR(size)	It is used to store national character data within the predefined length. It can be stored up to 2000 bytes.
VARCHAR2(size)	It is used to store variable string data within the predefined length. It can be stored up to 4000 byte.
VARCHAR(SIZE)	It is the same as VARCHAR2(size). You can also use VARCHAR(size), but it is suggested to use VARCHAR2(size)

NVARCHAR2(size)	It is used to store Unicode string data within the predefined length. We have to must specify the size of NVARCHAR2 data type. It can be stored up to 4000 bytes.

Oracle Numeric Data Types

NUMBER(p, s)	It contains precision p and scale s. The precision p can range from 1 to 38, and the scale s can range from -84 to 127.
FLOAT(p)	It is a subtype of the NUMBER data type. The precision p can range from 1 to 126.
BINARY_FLOAT	It is used for binary precision(32-bit). It requires 5 bytes, including length byte.
BINARY_DOUBLE	It is used for double binary precision (64-bit). It requires 9 bytes, including length byte.

Oracle Date and Time Data Types

DATE	It is used to store a valid date-time format with a fixed length. Its range varies from January 1, 4712 BC to December 31, 9999 AD.
TIMESTAMP	It is used to store the valid date in YYYY-MM-DD with time hh:mm:ss format.

Oracle Large Object Data Types (LOB Types)

BLOB	It is used to specify unstructured binary data. Its range goes up to 2^{32}-1 bytes or 4 GB.
BFILE	It is used to store binary data in an external file. Its range goes up to 2^{32}-1 bytes or 4 GB.

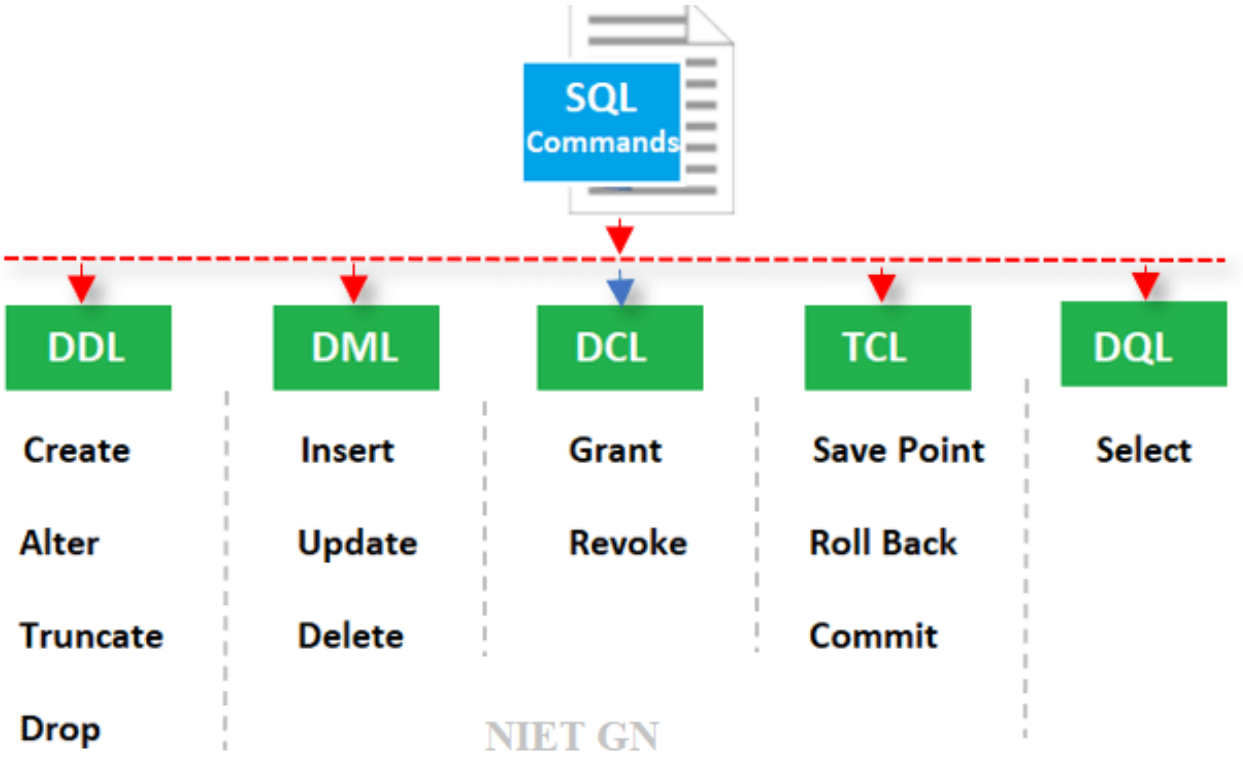
CLOB	It is used for single-byte character data. Its range goes up to 2^{32}-1 bytes or 4 GB.
NCLOB	It is used to specify single byte or fixed length multibyte national character set (NCHAR) data. Its range is up to 2^{32}-1 bytes or 4 GB.
RAW(size)	It is used to specify variable length raw binary data. Its range is up to 2000 bytes per row. Its maximum size must be specified.
LONG RAW	It is used to specify variable length raw binary data. Its range up to 2^{31}-1 bytes or 2 GB, per row.

SQL Commands in Oracle database

SQL can perform various tasks like create a table, add data to tables, drop the table, modify the table, set permission for users.

Types of SQL Commands

There are five types of SQL commands: **DDL, DML, DCL, TCL, and DQL.**



- DDL (Data Definition Language)
- DML (Data Manipulation Language)
- DCL (Data Control Language)
- TCL (Transaction Control Language)
- DQL (Data Query Language) (DRL)

DDL (Data Definition Language)

1. CREATE Command
2. DROP Command
3. ALTER Command
4. TRUNCATE Command
5. RENAME Command

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.

CREATE Command

CREATE is a DDL command its used to create databases, tables, triggers and other database objects.

1. The Table name must begin with a letter A-Z or a-z
2. The Table name can contain numbers and underscores
3. The name of the table can be in UPPER or lower case
4. The maximum length of the table name can be 30 characters
5. We cannot use the same name of another existing object in our schema
6. Don’t provide space in the table name. If you want to provide space in a table name then you can use the underscore symbol.
7. A table should contain a minimum of 1 column and a maximum of 1000 columns.

CREATE DDL Command in Oracle:

CREATE TABLE table_name
(
column_Name1 data_type (**size of** the **column**) ,
column_Name2 data_type (**size of** the **column**) ,
column_Name3 data_type (**size of** the **column**) ,
...
column_NameN data_type (**size of** the **column**)
) ;

create table student(sid number(10), sname varchar2(50), email varchar2(100), address varchar2(100), mobileNum number(12));

create table student(sid number(10) not null, sname varchar2(50), email varchar2(100), address varchar2(100), mobileNum number(12));

```
SQL> create table student(sid number(10) not null, sname varchar2(50), email varchar2(100), address var
char2(100), mobileNum number(12));

Table created.

SQL> desc student;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 SID                                       NOT NULL NUMBER(10)
 SNAME                                              VARCHAR2(50)
 EMAIL                                              VARCHAR2(100)
 ADDRESS                                            VARCHAR2(100)
 MOBILENUM                                          NUMBER(12)
```

create table student(Sid number(10) not null primary key, same varchar2(50), email varchar2(100), address varchar2(100), mobileNum number(12));

```
SQL> drop table student;

Table dropped.

SQL> create table student(sid number(10) not null primary key, sname varchar2(50), email varchar2(100),
 address varchar2(100), mobileNum number(12));

Table created.

SQL> desc student;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 SID                                       NOT NULL NUMBER(10)
 SNAME                                              VARCHAR2(50)
 EMAIL                                              VARCHAR2(100)
 ADDRESS                                            VARCHAR2(100)
 MOBILENUM                                          NUMBER(12)
```

create table student(sid number(10), sname varchar2(50), email varchar2(100), address varchar2(100), mobileNum number(12), admsiodate Date);

```
SQL> create table student(sid number(10), sname varchar2(50), email varchar2(100), address varchar2(100
), mobileNum number(12),admsiodate Date);

Table created.

SQL> desc student;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 SID                                                NUMBER(10)
 SNAME                                              VARCHAR2(50)
 EMAIL                                              VARCHAR2(100)
 ADDRESS                                            VARCHAR2(100)
 MOBILENUM                                          NUMBER(12)
 ADMSIODATE                                         DATE
```

1. **CREATE TABLE** Student
2. (
3. Roll_No. number(10) NOT NULL,
4. First_Name varchar2 (20) ,
5. Last_Name varchar2 (20) ,
6. Age **Int** ,
7. Marks **Int** ,
8.) ;

CREATETABLE persons (idINTNOTNULLPRIMARYKEYAUTO_INCREMENT, name VARCHAR(50)NOTNULL,birth_date DATE, phone VARCHAR(15)NOTNULLUNIQUE);

CREATETABLE persons (idINTNOTNULLPRIMARYKEYIDENTITY(1,1), name VARCHAR(50)NOTNULL,birth_dateDATE, phone VARCHAR(15)NOTNULLUNIQUE);

PRIMARY KEY on CREATE TABLE

he PRIMARY KEY constraint uniquely identifies each record in a table.

Primary keys must contain UNIQUE values, and cannot contain NULL values.

A table can have only ONE primary key;

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int,
    PRIMARY KEY (ID)
);
```

```
CREATE TABLE Persons (
    ID int NOT NULL PRIMARY KEY,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int
);
```

- The `NOT NULL` constraint ensures that the field cannot accept a `NULL` value.
- The `PRIMARY KEY` constraint marks the corresponding field as the table's primary key.
- The `AUTO_INCREMENT` attribute is a SQL extension to standard SQL, which tells MySQL to automatically assign a value to this field if it is left unspecified, by incrementing the previous value by 1. Only available for numeric fields.
- The `UNIQUE` constraint ensures that each row for a column must have a unique value.

ALTER **DDL Command in Oracle:**

1. Increase/decrease the length of a column.
2. Change the data type of a column.
3. Change NOT NULL to NULL or NULL to NOT NULL.
4. Used to add a new column to an existing table.
5. Used to drop an existing column.

1- alter table student add lastname varchar2(50);

```
SQL> alter table student add lastname varchar2(50);

Table altered.

SQL> desc student;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------
 SID                                                NUMBER(10)
 SNAME                                              VARCHAR2(50)
 EMAIL                                              VARCHAR2(100)
 ADDRESS                                            VARCHAR2(100)
 MOBILENUM                                          NUMBER(12)
 ADMSIODATE                                         DATE
 LASTNAME                                           VARCHAR2(50)
```

1. **ALTER TABLE** name_of_table **ADD** column_name column_definition;
   ALTER TABLE Student **ADD** Father's_Name **Varchar**(60);

1. **ALTER TABLE** customers **ADD** customer_age varchar2(50);

RENAME

RENAME : rename an objects

RENAME <OLD TABLE NAME> TO <NEW TABLE NAME>;

RENAME EMPLOYEE TO EMPLOYEEDETAILS;

TRUNCATE

TRUNCATE delete all the records or rows from a table without any condition,

TRUNCATE TABLE customers;

TRUNCATE TABLE <TABLE NAME>;

TRUNCATE TABLE EMPLOYEE;

DROP

DROP TABLE Table_Name;

DROP TABLE Student;

DROP TABLE EMPLOYEE;

DROP TABLE customers;

Note

How to view the list of tables in the oracle database?

To view the list of tables in the Oracle database, we need to use the following syntax.

SELECT * FROM TAB;

How to view the structure of a table in the oracle database?
Syntax: DESC <TABLE NAME>; (Desc = Describe)
Example: DESC EMPLOYEE;
DESCstudents;

DML Commands in SQL

1. INSERT Command
2. UPDATE Command
3. DELETE Command

DML(Data Manipulation Language):

1. **INSERT** – Is used to insert data into a table.
2. **UPDATE** – Is used to update existing data within a table.
3. **DELETE** – Is used to delete records from a database table.
4. **MERGE** – Is used to merge records of tables.

INSERT Statement in Oracle

In Oracle, INSERT statement is used to add a single record or multiple records into the table.

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

INSERT INTO Customers (CustomerName, ContactName, Address, City, PostalCode, Country) VALUES ('Cardinal', 'Tom B. Erichsen', 'Skagen 21', 'Stavanger', '4006', 'Norway');

INSERT INTO Customers (CustomerName, City, Country) VALUES ('Cardinal', 'Stavanger', 'Norway');

INSERT INTO employee (employee_id,name,vehicle_name) VALUES('AD010','Sharmishtha', 'Hector');

INSERT INTO suppliers (supplier_id, supplier_name) VALUES (50, 'Flipkart');

INSERT INTO students (student_id, student_name, student_age) VALUES (3, 'Happy', 11');

INSERT INTO persons (name,birth_date, phone)VALUES('Peter Wilson','1990-07-15','0711-020361');

DQL (Data Query Language):DRL

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

```
SELECT*FROM employees;
SELECTemp_id,emp_name,hire_date, salary FROM employees;
SELECT CustomerName, City FROM Customers;
```

The IS NULL Operator

The IS NULL operator is used to test for empty values (NULL values).

The following SQL lists all customers with a NULL value in the "Address" field:

```
SELECT column_names
FROM table_name
WHERE column_name IS NULL;
```

```
SELECT CustomerName, ContactName, Address
FROM Customers
WHERE Address IS NULL;
```

The IS NOT NULL Operator

The IS NOT NULL operator is used to test for non-empty values (NOT NULL values).

The following SQL lists all customers with a value in the "Address" field:

```
SELECT column_names
FROM table_name
WHERE column_name IS NOT NULL;
```

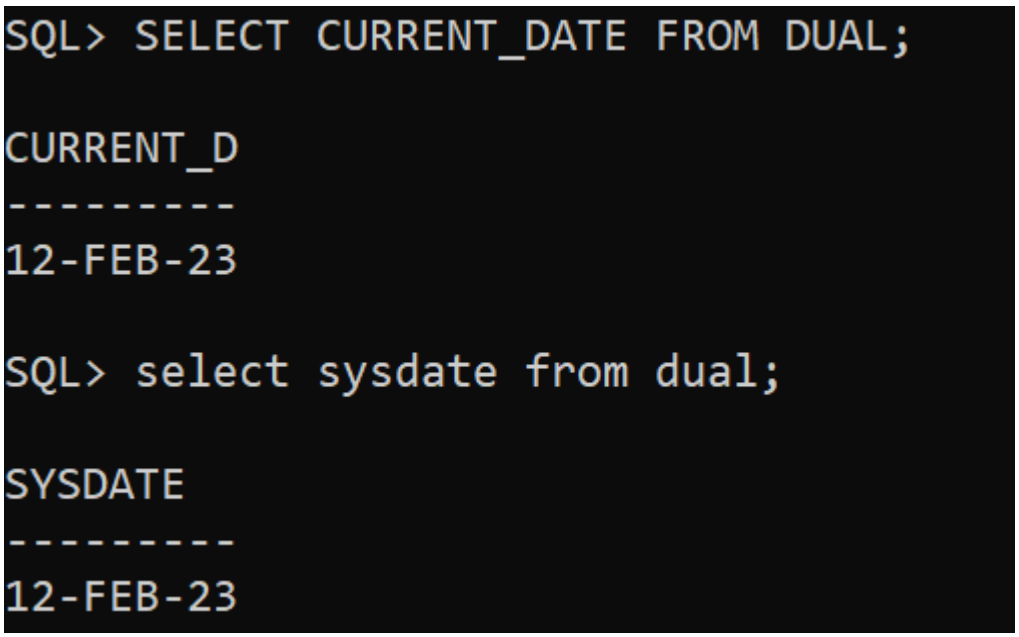
```
SELECT CustomerName, ContactName, Address
FROM Customers
WHERE Address IS NOT NULL;
```

CURRENT_DATE

```
SELECT CURRENT_DATE FROM DUAL;
```

SYSDATE

```
select sysdate from dual;
```



DISTINCT

The DISTINCT clause is used to remove duplicate rows from the result set:

```
SELECT DISTINCT column_list FROM table_name;
```

```
SELECT city FROM customers;
```

```
SELECTDISTINCT city FROM customers;
```

SELECT DISTINCT statement for a column that has multiple NULL values, Then SQL keeps one NULL value and removes others from the result set, because DISTINCT treats all the NULL values as the same value.

UPDATE Oracle

The UPDATE statement is used to modify the existing records in a table

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

```
UPDATE Customers SET ContactName = 'Alfred Schmidt', City= 'Frankfurt' WHERE CustomerID = 1;
```

```
UPDATE suppliers SET supplier_name = 'Kingfisher' WHERE supplier_id = 2;
```

```
UPDATE suppliers SET supplier_address = 'Agra', supplier_name = 'Bata shoes' WHERE supplier_id = 1;
```

Oracle DELETE Statement

In Oracle, DELETE statement is used to remove or delete a single record or multiple records from a table.

```
DELETEFROMtable_nameWHEREcondition;
```

```
DELETEFROM persons WHERE id >3;
```

```
DELETEFROM persons;
```

```
DELETE FROM Customers;
```

```
DELETE FROM Customers WHERE CustomerName='AlfredsFutterkiste';
```

DCL (Data Control Language):

- **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.

TCL (Transaction Control Language):

- **COMMIT:** Commits a Transaction.
- **ROLLBACK:** Rollbacks a transaction in case of any error occurs.
- **SAVEPOINT:** Sets a save point within a transaction.

Oracle Insert Statement

In Oracle, INSERT statement is used to add a single record or multiple records into the table.

Syntax: (Inserting a single record using the Values keyword):

INSERT INTO table_name (column_list) VALUES(value_list);

1. **INSERT INTO table**
2. (column1, column2, ... column_n)
3. **VALUES**
4. (expression1, expression2, ... expression_n);

Syntax: (Inserting multiple records using a SELECT statement):

1. **INSERT INTO** suppliers (supplier_id, supplier_name) **VALUES** (50, 'Flipk art');

```
CREATE TABLE employee_details(
emp_idVARCHAR(8),
emp_nameVARCHAR(20),
emp_dept_idVARCHAR(20),
emp_age INT);

CREATE TABLE discounts (
discount_id NUMBER GENERATED BY DEFAULT AS IDENTITY,
discount_name VARCHAR2(255) NOT NULL,
    amount NUMBER(3,1) NOT NULL,
start_date DATE NOT NULL,
expired_date DATE NOT NULL
);
INSERT INTO discounts(discount_name, amount, start_date,
expired_date)
VALUES('Summer Promotion', 9.5, DATE '2017-05-01', DATE '2017-08-
31');

INSERT INTO Customers (CustomerName, ContactName, Address, City,
PostalCode, Country)
VALUES ('Cardinal', 'Tom B. Erichsen', 'Skagen 21', 'Stavanger', '4006',
'Norway');

INSERT INTO Customers (CustomerName, City, Country)
VALUES ('Cardinal', 'Stavanger', 'Norway');
```

```
SELECT*FROMdiscounts;
```

Exa1

```
create table Info(id integer, Cost integer, city varchar(200));
insert into Info(id, Cost,city) values(1, 100,"Pune");
insert into Info(id, Cost,city) values(2, 50, "Satara");
insert into Info(id, Cost,city) values(3, 65,"Pune");
insert into Info(id, Cost,city) values(4, 97,"Mumbai");
insert into Info(id, Cost,city) values(5, 12,"USA");
select * from Info;
```

Exa2

```
create table Info(id integer, Cost integer,citynvarchar(200));
INSERT INTO Info (id,Cost,city)
VALUES (1,200, 'Pune'), (2, 150,'USA'), (3,345, 'France');

INSERT INTO Orders_TblVALUES('1250', '2011-10-21', '8740', 'Not
Specified', '35');
INSERT INTO Orders_TblVALUES('1251', '2011-11-21', '8741', 'Not
Specified', '36');
INSERT INTO Orders_TblVALUES('1252', '2011-12-21', '8742', 'Not
Specified', '37');

INSERT INTO Pets (PetId, PetTypeId, OwnerId, PetName, DOB)
VALUES ( 1, 2, 3, 'Fluffy', '2020-11-20' );
```

```
INSERT INTO Pets (PetId, PetTypeId, OwnerId, PetName, DOB)
VALUES ( 2, 3, 3, 'Fetch', '2019-08-16' );

INSERT INTO Pets (PetId, PetTypeId, OwnerId, PetName, DOB)
VALUES ( 3, 2, 2, 'Scratch', '2018-10-01' );

INSERT INTO Pets (PetId, PetTypeId, OwnerId, PetName, DOB)
VALUES
    (1, 2, 3, 'Fluffy', '2020-11-20'),
    (2, 3, 3, 'Fetch', '2019-08-16'),
    (3, 2, 2, 'Scratch', '2018-10-01');
select * from Info;
```

UPDATE

he UPDATE statement is used to modify the existing records in a table.

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

```
UPDATE Customers
SET ContactName = 'Alfred Schmidt', City= 'Frankfurt'
WHERE CustomerID = 1;
```

Oracle Update Example: (Update single column)

```
1. UPDATE suppliers
2. SET supplier_name = 'Kingfisher'
3. WHERE supplier_id = 2;
```

Oracle Update Example: (Update multiple columns)

```
1. UPDATE suppliers
2. SET supplier_address = 'Agra',
3.     supplier_name = 'Bata shoes'
4. WHERE supplier_id = 1;
```

DELETE Statement

The DELETE statement is used to delete existing records in a table.

DELETE Syntax

DELETE FROM *table_name* WHERE *condition*;

DELETE FROM Customers WHERE CustomerName='AlfredsFutterkiste';

```
1. DELETE FROM customers  WHERE name = 'Sohan';
```

```
1. DELETE FROM customers  WHERE last_name = 'Maurya'  AND customer
   _id > 2;
```

Delete All Records

It is possible to delete all rows in a table without deleting the table. This means that the table structure, attributes, and indexes will be intact:

DELETE FROM *table_name*;

DELETE FROM Customers;

Delete	Truncate
The DELETE command is used to delete specified rows(one or more).	While this command is used to delete all the rows from a table.
It is a DML(Data Manipulation Language) command.	While it is a DDL(Data Definition Language) command.
There may be a WHERE clause in the DELETE command in order to filter the records.	While there may not be WHERE clause in the TRUNCATE command.
In the DELETE command, a tuple is locked before removing it.	While in this command, the data page is locked before removing the table data.
The DELETE statement removes rows one at a time and records an entry in the transaction log for each deleted row.	TRUNCATE TABLE removes the data by deallocating the data pages used to store the table data and records only the page deallocations in the transaction log.
DELETE command is slower than TRUNCATE command.	While the TRUNCATE command is faster than the DELETE command.
To use Delete you need DELETE permission on the table.	To use Truncate on a table we need at least ALTER permission on the table.
The identity of the fewer column retains the identity	Identity the column is reset to its seed value if the table contains an identity column.

Delete	Truncate
after using DELETE Statement on the table.	
The delete can be used with indexed views.	Truncate cannot be used with indexed views.
This command can also active trigger.	This command does not active trigger.
DELETE statement occupies more transaction spaces than Truncate.	Truncate statement occupies less transaction spaces than DELETE.

Example of DELETE, DROP, and TRUNCATE commands in SQL

- The SQL DROP command is a DDL (Data Definition Language) command that deletes the defined table with all its table data, associated indexes, constraints, triggers, and permission specifications.
- The SQL DELETE command is a DML (Data Manipulation Language) command that deletes existing records from the table in the database.
- The SQL TRUNCATE command is a DDL (Data Definition Language) command that modifies the data in the database.
  The TRUNCATE command helps us delete the complete records from an existing table in the database.

DROP TABLE Student;

DELETE FROM Student WHERE Roll_No = 101;

TRUNCATE TABLE Student;

DQL

Oracle SELECT Statement

The Oracle SELECT statement is used to retrieve data from one or more than one tables, object tables, views, object views etc.

SELECT *column1*, *column2*, ...
FROM *table_name*;

SELECT * FROM *table_name*;

SELECT * FROM Customers;

SELECT CustomerName, City FROM Customers;

SELECT UNIQUE

Actually, there is no difference between DISTINCT and UNIQUE.

SELECT UNIQUE is an old syntax which was used in oracle description but later ANSI standard defines DISTINCT as the official keyword.

After that oracle also added DISTINCT but did not withdraw the service of UNIQUE keyword for the sake of backward compatibility.

In simple words, we can say that SELECT UNIQUE statement is used to retrieve a unique or distinct element from the table.

1. **SELECT UNIQUE** column_name
2. **FROM** table_name;

SELECT DISTINCT

1. **DISTINCT command** is used with SELECT key word to retrieve only distinct or unique data.
2. In a table, there may be a chance to exist a duplicate value and sometimes we want to retrieve only unique values. In such scenarios, SQL SELECT DISTINCT statement is used

3. **SELECT DISTINCT** expressions **FROM** tables **WHERE** conditions;

```
1. CREATE TABLE  "CUSTOMERS"
2.    (    "NAME" VARCHAR2(4000),
3.     "AGE" NUMBER,
4.     "SALARY" NUMBER,
5.     "STATE" VARCHAR2(4000)
6.    )
```

```
1. SELECT DISTINCT state
2. FROM customers
3. WHERE name = 'charu';
```

```
1. SELECT DISTINCT name, age, salary
2. FROM customers
3. WHERE age >= '60';
```

> ***SQL SELECT UNIQUE and SQL SELECT DISTINCT statements are same.***

ORDER BY Clause

In Oracle, ORDER BY Clause is used to sort or re-arrange the records in the result set. The ORDER BY clause is only used with SELECT statement.

```
1. SELECT *
2. FROM customers
3. WHERE salary >= 20000
4. ORDER BY salary ASC;
```

ASC: It is an optional parameter that is used to sort records in ascending order.

DESC: It is also an optional parameter that is used to sort records in descending order

1. **SELECT** *
2. **FROM** supplier
3. **ORDER BY** last_name;

SQL SELECT COUNT

The **SQL COUNT()** is a function that returns the number of records of the table in the output.

This function is used with the SQL SELECT statement.

Select Count(*) Function in SQL

The count(*) function in SQL shows all the Null and Non-Null records present in the table.

Syntax of Count (*) Function in SQL

1. **SELECT** COUNT(*) **FROM** table_name;
2. **SELECT** COUNT (*) **FROM** Bikes ;

1. **SELECT** COUNT(column_name) **FROM** table_name;

SQL JOIN

JOIN means *to combine something*. In case of SQL, JOIN means **"to combine two or more tables"**.

The SQL JOIN clause takes records from two or more tables in a database and combines it together.

Choose columns from each table that should be used in the join. A join condition indicates a foreign key from one table

Types of Joins

- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL JOIN
- Cross Join
- Natural Join

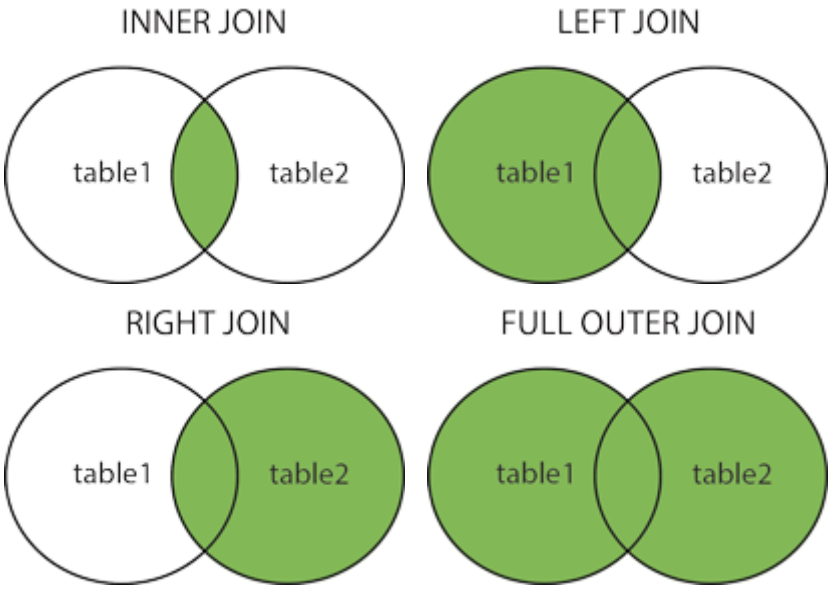
Different Types of SQL JOINs

(INNER) JOIN: Returns records that have matching values in both tables

LEFT (OUTER) JOIN: Returns all records from the left table, and the matched records from the right table

RIGHT (OUTER) JOIN: Returns all records from the right table, and the matched records from the left table

FULL (OUTER) JOIN: Returns all records when there is a match in either left or right table



INNER JOIN

The INNER JOIN keyword selects records that have matching values in both tables. **Student**

ROLL_NO	NAME	ADDRESS	PHONE	Age
1	HARSH	DELHI	XXXXXXXXXX	18
2	PRATIK	BIHAR	XXXXXXXXXX	19
3	RIYANKA	SILIGURI	XXXXXXXXXX	20
4	DEEP	RAMNAGAR	XXXXXXXXXX	18
5	SAPTARHI	KOLKATA	XXXXXXXXXX	19
6	DHANRAJ	BARABAJAR	XXXXXXXXXX	20
7	ROHIT	BALURGHAT	XXXXXXXXXX	18
8	NIRAJ	ALIPUR	XXXXXXXXXX	19

StudentCourse

COURSE_ID	ROLL_NO
1	1
2	2
2	3
3	4
1	5
4	9
5	10
4	11

SELECT StudentCourse.COURSE_ID, Student.NAME, Student.AGE FROM Student

INNER JOIN StudentCourse

ON Student.ROLL_NO = StudentCourse.ROLL_NO;

COURSE_ID	NAME	Age
1	HARSH	18
2	PRATIK	19
2	RIYANKA	20
3	DEEP	18
1	SAPTARHI	19

LEFT JOIN

The LEFT JOIN keyword returns all records from the left table (table1), and the matching records from the right table (table2). The result is 0 records from the right side, if there is no match.

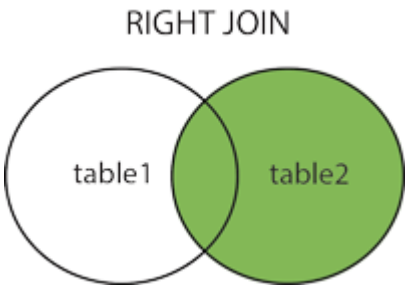
```
SELECT Student.NAME,StudentCourse.COURSE_ID
FROM Student
LEFT JOIN StudentCourse
ON StudentCourse.ROLL_NO = Student.ROLL_NO;
```

SELECT t1.emp_id, t1.emp_name, t1.hire_date, t2.dept_name FROM employees AS t1 LEFTJOIN departments AS t2 ON t1.dept_id = t2.dept_id ORDERBYemp_id;

NAME	COURSE_ID
HARSH	1
PRATIK	2
RIYANKA	2
DEEP	3
SAPTARHI	1
DHANRAJ	*NULL*
ROHIT	*NULL*
NIRAJ	*NULL*

RIGHT JOIN

The RIGHT JOIN keyword returns all records from the right table (table2), and the matching records from the left table (table1). The result is 0 records from the left side, if there is no match.




```
SELECT Student.NAME,StudentCourse.COURSE_ID
FROM Student
RIGHT JOIN StudentCourse
ON StudentCourse.ROLL_NO = Student.ROLL_NO;
```

SELECT t1.emp_id, t1.emp_name, t1.hire_date, t2.dept_name FROM employees AS t1 RIGHTJOIN departments AS t2 ON t1.dept_id = t2.dept_id ORDERBYdept_name;

NAME	COURSE_ID
HARSH	1
PRATIK	2
RIYANKA	2
DEEP	3
SAPTARHI	1
NULL	4
NULL	5
NULL	4

ULL OUTER JOIN

The FULL OUTER JOIN keyword returns all records when there is a match in left (table1) or right (table2) table records.

Tip: FULL OUTER JOIN and FULL JOIN are the same.

SELECT Student.NAME,StudentCourse.COURSE_ID

FROM Student

FULL JOIN StudentCourse

ON StudentCourse.ROLL_NO = Student.ROLL_NO;

SELECT t1.emp_id, t1.emp_name, t1.hire_date, t2.dept_name FROM employees AS t1 FULLJOIN departments AS t2 ON t1.dept_id = t2.dept_id ORDERBYemp_name;