

Introduction to SQL Language

What is SQL?

SQL stands for Structured Query Language which is used to operate databases. SQL is a language which is used for storing, retrieving and manipulating data stored in relational databases. It is ANSI – American National Standards Institute standard. The basic construct which helps in fetching or manipulating records stored in RDBMS – Relational Database Management System is called “**SQL Query**”. Commonly also known as SQL commands or SQL Query helps in communicating with the database to perform certain tasks and functions with data. SQL is case insensitive.

The SQL related Data Manipulation Language commands are:

- ✓ SELECT
- ✓ INSERT
- ✓ UPDATE
- ✓ DELETE

Why do we need SQL?

SQL is the most popular RDBMS related language and comes in with several advantages such as:

- ✓ Has flexible inbuilt constructs making it easy to access data from RDBMS
- ✓ User can describe the data as well as the data type for the data to be stored into RDBMS
- ✓ User can retrieve and manipulate the data stored in RDBMS
- ✓ Users can drop or create tables, schemas, databases
- ✓ Has features enabling easy creation of function, views, stored procedures, packages
- ✓ Can be easily embedded within other languages using SQL libraries such as JDBC used for Java
- ✓ Provides various levels of security features by restricting or granting privileges to only authorized users. This is commonly referred as DCL – Data Control Language having commands such as REVOKE and GRANT
- ✓ Has DDL – Data Definition Language options such as CREATE, ALTER, DROP, TRUNCATE

Understanding the Basics of SQL Structuring:

The most basic structuring in SQL is called “**Table**”. Tables in RDBMS help to store data. Tables contain one or more columns. Each column will have a data type. It can contain zero or more rows.

1. Create table Command:

An example of Create Table-

```
CREATE TABLE STUDENTS (  
    Student_Id int,  
    FirstName varchar(200),  
    LastName varchar(200)  
);
```

Here table Name is STUDENTS with columns as Student_Id, FirstName and LastName. Data Types of these columns are given along with the column names as int and varchar. SQL also has several other datatypes such as date, timestamp, blob, bigint, clob etc.

2. **Insert Table Command:**

An example of Insert Table-

```
INSERT INTO STUDENTS (Student_Id, FirstName, LastName) VALUES(1,'Anne','Berry');  
INSERT INTO STUDENTS (Student_Id, FirstName, LastName) VALUES(2,'Rob','Nicolas');  
COMMIT;
```

In the above insert queries we have inserted two rows in the Students table.

Please note at the end you require a COMMIT statement to allow changes to be reflected into your RDBMS. COMMIT is required for DML statements such as Insert, update, delete.

In case you have run the insert command but do not wish to commit the changes, then you can use ROLLBACK. ROLLBACK allows changes to be not reflected in the database provided its triggered prior to any COMMIT.

3. **Select Table Command:**

An example of Select Table-

```
SELECT * FROM STUDENTS;  
SELECT * FROM STUDENTS WHERE Student_Id = 1;
```

The first command will select and retrieve all the rows from the table. In this case 2 rows which we have inserted.

The second command has a WHERE clause which is used as a filtering condition. We can use WHERE clause to filter data from the table based on certain condition such as "Student_Id=1"

4. **Update Table Command:**

An example of Update Table-

```
UPDATE STUDENTS SET FIRSTNAME='Annie' WHERE Student_Id = 1;

COMMIT;
```

Here we have changed the FirstName from Anne to Annie for record having Student_Id = 1. Again COMMIT is used to reflect the changes into database.

5. **Delete Table Command:**

An example of Delete Table-

```
DELETE STUDENTS WHERE Student_Id = 1;

COMMIT;
```

Here we are deleting the row with Student_Id = 1. So the table will contain only 1 row now with Student_Id = 2.

6. **Alter Table Command:**

An example of Alter Table-

```
ALTER TABLE STUDENTS ADD CITY VARCHAR(200);
```

Here we are adding an additional column CITY to STUDENTS table. You can also add multiple columns, modify column, drop column, rename column name, rename table name using alter commands.

7. **Truncate Table Command:**

An example of Truncate Table-

```
TRUNCATE TABLE STUDENTS;
```

This will empty all the rows but not delete the table.

8. **Drop Table Command:**

An example of Drop Table-

```
DROP TABLE STUDENTS;
```

This command will remove the table STUDENTS from the database.

CONCLUSION:

Above explained is an Introduction to SQL. Further to this, there are several flexible constructs in SQL such as different types of table joins, sequences, views, procedures, functions and packages. Examples: <https://www.tsql.info/>