

SQL (Structured Query Language)

Structured Query Language is a database computer language designed for managing data in relational database management systems (RDBMS), and originally based upon Relational Algebra. Its scope includes data query and update, schema creation and modification, and data access control.

SQL was one of the first languages for Edgar F. Codd's relational model and became the most widely used language for relational databases.

- IBM developed SQL in mid of 1970's.
- Oracle incorporated in the year 1979.
- SQL used by IBM/DB2 and DS Database Systems.
- SQL adopted as standard language for RDBS by ANSI in 1989.

DATA TYPES:

1. CHAR (Size): This data type is used to store character strings values of fixed length. The size in brackets determines the number of characters the cell can hold. The maximum number of character is 255 characters.

2. VARCHAR (Size) / VARCHAR2 (Size): This data type is used to store variable length alphanumeric data. The maximum character can hold is 2000 character.

3. NUMBER (P, S): The NUMBER data type is used to store number (fixed or floating point). Number of virtually any magnitude may be stored up to 38 digits of precision. Number as large as 9.99×10^{124} . The precision (p) determines the number of places to the right of the decimal. If scale is omitted then the default is zero. If precision is omitted, values are stored with their original precision up to the maximum of 38 digits.

4. DATE: This data type is used to represent date and time. The standard format is DD-MM-YY as in 17-SEP-2009. To enter dates other than the standard format, use the appropriate functions. Date time stores date in the 24-Hours format. By default the time in a date field is 12:00:00 am, if no time portion is specified. The default date for a date field is the first day the current month.

5. LONG: This data type is used to store variable length character strings containing up to 2GB. Long data can be used to store arrays of binary data in ASCII format. LONG values cannot be indexed, and the normal character functions such as SUBSTR cannot be applied.

6. RAW: The RAW data type is used to store binary data, such as digitized picture or image. Data loaded into columns of these data types are stored without any further conversion. RAW data type can have a maximum length of 255 bytes. LONG RAW data type can contain up to 2GB.

SQL language is sub-divided into several language elements, including:

- *Clauses*, which are in some cases optional, constituent components of statements and queries.
- *Expressions*, which can produce either scalar values or tables consisting of columns and rows of data.
- *Predicates* which specify conditions that can be evaluated to SQL three-valued logic (3VL) Boolean truth values and which are used to limit the effects of statements and queries, or to change program flow.
- *Queries* which retrieve data based on specific criteria.
- *Statements* which may have a persistent effect on schemas and data, or which may control transactions, program flow, connections, sessions, or diagnostics.
- SQL statements also include the semicolon (";") statement terminator. Though not required on every platform, it is defined as a standard part of the SQL grammar.
- *Insignificant white space* is generally ignored in SQL statements and queries, making it easier to format SQL code for readability.

There are five types of SQL statements. They are:

1. DATA DEFINITION LANGUAGE (DDL)
2. DATA MANIPULATION LANGUAGE (DML)
3. DATA CONTROL LANGUAGE (DCL)
4. TRANSACTIONAL CONTROL LANGUAGE (TCL)

1. DATA DEFINITION LANGUAGE (DDL): The Data Definition Language (DDL) is used to create and destroy databases and database objects. These commands will primarily be used by database administrators during the setup and removal phases of a database project. Let's take a look at the structure and usage of four basic DDL commands:

1. CREATE
2. ALTER
3. DROP
4. RENAME

1. CREATE:

(a) **CREATE TABLE:** This is used to create a new relation (table)

Syntax: CREATE TABLE <relation_name/table_name> (field_1 data_type(size), field_2 data_type(size), .. .);

Example:

SQL> CREATE TABLE Student (sno NUMBER (3), sname CHAR (10), class CHAR (5));

2. ALTER:

(a) **ALTER TABLE ...ADD...:** This is used to add some extra fields into existing relation.

Syntax: ALTER TABLE relation_name ADD (new field_1 data_type(size), new field_2 data_type(size),...);

Example: SQL>ALTER TABLE std ADD (Address CHAR(10));

(b) **ALTER TABLE...MODIFY...:** This is used to change the width as well as data type of fields of existing relations.

Syntax: ALTER TABLE relation_name MODIFY (field_1 newdata_type(Size), field_2 newdata_type(Size), ... field_newdata_type(Size));

Example: SQL>ALTER TABLE student MODIFY(sname VARCHAR(10),class VARCHAR(5));

(c) **ALTER TABLE..DROP** This is used to remove any field of existing relations.

Syntax: ALTER TABLE relation_name DROP COLUMN (field_name);

Example: SQL>ALTER TABLE student DROP column (sname);

(d) **ALTER TABLE..RENAME...:** This is used to change the name of fields in existing relations.

Syntax: ALTER TABLE relation_name RENAME COLUMN (OLD field_name) to (NEW field_name);

Example: SQL>ALTER TABLE student RENAME COLUMN sname to stu_name;

3. DROP TABLE: This is used to delete the structure of a relation. It permanently deletes the records in the table.

Syntax: DROP TABLE relation_name;

Example: SQL>DROP TABLE std;

4. RENAME: It is used to modify the name of the existing database object. **Syntax:** RENAME TABLE

old_relation_name TO new_relation_name; **Example:** SQL>RENAME TABLE std TO std1;

ASSIGNMENT 2

1. Create a table EMPLOYEE with following schema:

(Emp_no, E_name, E_address, E_ph_no, Dept_no, Dept_name, Job_id , Salary)

2. Add a new column; HIREDATE to the existing relation.

3. Change the datatype of JOB_ID from char to varchar2.

4. Change the name of column/field Emp_no to E_no.

5. Modify the column width of the job field of emp table .

6. Create a back up table named **Emp1** as a copy of **EMPLOYEE** table.

7. Drop table **EMPLOYEE**.