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.

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.
4. **DATE:** This data type is used to represent date and time. The standard format is DD-MM-YY as in 17-SEP-2009. 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.
6. **RAW:** The RAW data type is used to store binary data, such as digitized picture or image.

There are five types of SQL statements. They are:

1. DATA DEFINITION LANGUAGE (DDL)
2. DATA MANIPULATION LANGUAGE (DML)
3. DATA RETRIEVAL LANGUAGE (DRL)
4. TRANSATIONAL CONTROL LANGUAGE (TCL)
5. DATA CONTROL LANGUAGE (DCL)

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. Basic DDL commands: CREATE, ALTER, DROP, RENAME and TRUNCATE.

   a) **CREATE:**

   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));

b) ALTER:

i. 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),..);

ii. 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));

iii. ALTER TABLE..DROP ...:. This is used to remove any field of existing relations.

Syntax: ALTER TABLE relation_name DROP COLUMN (field_name);

iv. 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);

c) 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;

d) RENAME: It is used to modify the name of the existing database object.

Syntax: RENAME TABLE old_relation_name TO new_relation_name;

e) TRUNCATE: This command will remove the data permanently. But structure will not be removed.

Syntax: TRUNCATE TABLE <Table name>

2. DATA MANIPULATION LANGUAGE (DML): The Data Manipulation Language (DML) is used to retrieve, insert and modify database information. These commands

will be used by all database users during the routine operation of the database. Basic DML commands: **INSERT, UPDATE, and DELETE.**

a) **INSERT INTO:** This is used to add records into a relation. These are three type of INSERT INTO queries which are as:

i. **Inserting a single record**

Syntax: INSERT INTO < relation/table name> (field_1,field_2……field_n)VALUES (data_1,data_2, ...data_n);

ii. **Inserting a single record**

Syntax: INSERT INTO < relation/table name>VALUES (data_1,data_2, ... data_n);

iii. **Inserting all records from another relation**

Syntax: INSERT INTO relation_name_1 SELECT Field_1,field_2,field_n FROM relation_name_2 WHERE field_x=data;

iv. **Inserting multiple records**

Syntax: INSERT INTO relation_name field_1,field_2, ... field_n) VALUES (&data_1,&data_2, ... &data_n);

b) **UPDATE-SET-WHERE:** This is used to update the content of a record in a relation.

Syntax: SQL>UPDATE relation name SET Field_name1=data,field_name2=data, WHERE field_name=data;

c) **DELETE-FROM:** This is used to delete all the records of a relation but it will retain the structure of that relation.

i. DELETE-FROM: This is used to delete all the records of relation.

Syntax: SQL>DELETE FROM relation_name;

ii. **DELETE -FROM-WHERE:** This is used to delete a selected record from a relation.

Syntax: SQL>DELETE FROM relation_name WHERE condition;

3. DATA RETRIEVAL LANGUAGE (DRL)/ DATA QUERY LANGUAGE(DQL)

DQL is used to fetch the data from the database.

a) **SELECT:** To Retrieve data from one or more tables.

i. SELECT FROM: To display all fields for all records.

Syntax: SELECT * FROM relation_name;

ii. **SELECT FROM:** To display a set of fields for all records of relation.

Syntax: SELECT a set of fields FROM relation_name;

iii. **SELECT - FROM -WHERE:** This query is used to display a selected set of fields for a selected set of records of a relation.

Syntax: SELECT a set of fields FROM relation_name WHERE condition;

4. TRANSATIONAL CONTROL LANGUAGE (TCL)

TCL commands are used to manage transactions in database. These are used to manage the changes made by DML statements. This language in SQL contains the following commands: **COMMIT, ROLLBACK** and **SAVE POINT**.

5. DATA CONTROL LANGUAGE (DCL)

DCL commands are used to grant and take back authority from any database user.This language in SQL contains the following commands: **GRANT** and **REVOKE**.