STRUCTURED QUERY LANGUAGE

SQL is a standard language for accessing and manipulating databases.

What is SQL?

- SQL stands for Structured Query Language
- SQL lets you access and manipulate databases
- SQL is an ANSI (American National Standards Institute) standard

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 General Data Types

Data type	Access	SQLServer	Oracle	MySQL	PostgreSQL
boolean	Yes/No	Bit	Byte	N/A	Boolean
integer	Number (integer)	Int	Number	Int Integer	Int Integer
float	Number (single)	Float Real	Number	Float	Numeric
currency	Currency	Money	N/A	N/A	Money
string (fixed)	N/A	Char	Char	Char	Char
string (variable)	Text (<256) Memo (65k+)	Varchar	Varchar Varchar2	Varchar	Varchar
binary object	OLE Object Memo	Binary (fixed up to 8K) Varbinary (<8K) Image (<2GB)	Long Raw	Blob Text	Binary Varbinary

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds	Maria	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo	Ana Trujillo	Avda. de la 2222	México D.F.	05021	Mexico
3	Antonio	Antonio Moreno	Materos 2312	México D.F.	05023	Mexico
4	Around thom	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds	Christina	Bgen 8	Lule	S-958 22	Sweden

SQL CREATE TABLE Statement

- The CREATE TABLE statement is used to create a table in a database.
- Tables are organized into rows and columns; and each table must have a name.

- SQL CREATE TABLE Syntax

  -
    ```
    CREATE TABLE table_name
    (
    column_name1 data_type(size),
    column_name2 data_type(size),
    column_name3 data_type(size),
    ....
    );
    ```

- Example

-
  ```
  CREATE TABLE Persons
  (
  PersonID int,
  LastName varchar(255),
  FirstName varchar(255),
  Address varchar(255),
  City varchar(255)
  );
  ```

SQL INSERT INTO Statement

- The INSERT INTO statement is used to insert new records in a table.

- INSERT INTO *table_name*
  VALUES (*value1*,*value2*,*value3*,...);

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

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

SQL SELECT Statement

- The SELECT statement is used to select data from a database.
- The result is stored in a result table, called the result-set.

- SELECT * FROM *table_name*;

- SELECT *column_name*,*column_name*
  FROM *table_name*;

SQL SELECT DISTINCT Statement

- In a table, a column may contain many duplicate values; and sometimes you only want to list the different (distinct) values.
- The DISTINCT keyword can be used to return only distinct (different) values.

  - SQL SELECT DISTINCT Syntax
  - SELECT DISTINCT *column_name*,*column_name*
    FROM *table_name*;

- Example
- SELECT DISTINCT City FROM Customers;

SQL WHERE Clause

- The WHERE clause is used to extract only those records that fulfill a specified criterion.

- SQL WHERE Syntax
  - SELECT *column_name*,*column_name*
    FROM *table_name*
    WHERE *column_name operator value*;
- Example
- SELECT * FROM Customers
  WHERE Country='Mexico';

Operators in The WHERE Clause

Operator	Description
=	Equal
<>	Not equal. **Note:** In some versions of SQL this operator may be written as !=
>	Greater than
<	Less than
>=	Greater than or equal
<=	Less than or equal
BETWEEN	Between an inclusive range
LIKE	Search for a pattern
IN	To specify multiple possible values for a column

SQL AND & OR Operators

- The AND operator displays a record if both the first condition AND the second condition are true.
- The OR operator displays a record if either the first condition OR the second condition is true.
- Example

  -
    ```
    SELECT * FROM Customers
    WHERE Country='Germany'
    AND City='Berlin';
    ```
- Example

  -
    ```
    SELECT * FROM Customers
    WHERE Country='Germany'
    AND City='Berlin';
    ```

SQL ORDER BY Keyword

- The ORDER BY keyword is used to sort the result-set by one or more columns.
- The ORDER BY keyword sorts the records in ascending order by default. To sort the records in a descending order, you can use the DESC keyword.
- SQL ORDER BY Syntax
  - SELECT *column_name*,*column_name*
    FROM *table_name*
    ORDER BY *column_name*,*column_name* ASC|DESC;

- Example
- SELECT * FROM Customers ORDER BY Country;
- Example
- SELECT * FROM Customers ORDER BY Country DESC;

SQL UPDATE Statement

- The UPDATE statement is used to update existing records in a table.
- SQL UPDATE Syntax
  - UPDATE *table_name*
    SET *column1=value1*,*column2=value2*,...
    WHERE *some_column=some_value*;
- Example
- UPDATE Customers
  SET ContactName='Alfred Schmidt', City='Hamburg'
  WHERE CustomerName='Alfreds Futterkiste';
-

SQL DELETE Statement

- The DELETE statement is used to delete rows in a table.

- Example
- DELETE FROM Customers
  WHERE CustomerName='Alfreds Futterkiste' AND ContactName='Maria Anders';