



SQL (Structured Query Language)

Day- 1

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Database

- What is a database?
- Common examples of database
- Models of database
 - Relational
 - Hierarchical
 - Network

History of SQL

- E.F. Codd published “A Relational Model of Data for Large Shared Data Banks”
- Ingres- first non commercial relational database
- SEQUEL became SQL
- Birth of Oracle

Why SQL

- Standard for RDBMS
- Cost-effective
- Base of every database implementation

The concept of SQL is underpinned by the relational algebra - a consistent framework for organizing and manipulating sets of data - and the SQL syntax concisely and intuitively expresses this mathematical system

When a developer writes a SQL query, he or she simply describes the results that they want. The developer does not have to get into any of the nitty-gritty of describing how to get the results

The fact that SQL is a declarative language not only shields the developer from the complexities of the underlying query techniques, but also gives the underlying SQL engine a lot of flexibility in how to optimize any given query.

SQL provides a robust framework that adapts to new requirements

Terminology

- **Relation** : a table
- **Tuple** : a row in a table
- **Attribute** : a Column in a table
- **Degree** : number of attributes
- **Cardinality** : number of tuples

Keys

- **Primary Key**
- **Unique Key**
- **Foreign Key**

Constraints

- NOT NULL Constraint

Ensures that a column cannot have NULL value.

- DEFAULT Constraint

Provides a default value for a column when none is specified.

- UNIQUE Constraint

Ensures that all values in a column are different.

- PRIMARY Key

Uniquely identified each rows/records in a database table.

Constraints

- FOREIGN Key

Uniquely identified a rows/records in any another database table.

- CHECK Constraint

The CHECK constraint ensures that all values in a column satisfy certain conditions.

- INDEX

Use to create and retrieve data from the database very quickly.

Components of SQL

SQL consists of three components:

- Data Definition Language (DDL)

This component of the SQL language is used to create and modify tables and other objects in the database.

- Data Manipulation Language (DML)

*This component of the SQL language is used to manipulate data **within** a table.*

- Data Control Language (DCL)

This component of the SQL language is used to create privileges to allow users access to, and manipulation of, the database

Data Definition Language (DDL)

- **CREATE** - to create objects in the database
- **ALTER** - alters the structure of the database
- **DROP** - delete objects from the database
- **TRUNCATE** - remove all records from a table, including all spaces allocated for the records are removed

Data Manipulation Language (DML)

- **SELECT** - retrieve data from the a database
- **INSERT** - insert data into a table
- **UPDATE** - updates existing data within a table
- **DELETE** - deletes all records from a table, the space for the records remain

Data Control Language (DCL)

- **GRANT** - gives user's access privileges to database
- **REVOKE** - withdraw access privileges given with the GRANT command

Transaction Control (TCL)

- **COMMIT** - save work done
- **SAVEPOINT** - identify a point in a transaction to which you can later roll back
- **ROLLBACK** - restore database to original since the last COMMIT

Data Definition Language(DDL)

CREATE

- The SQL CREATE TABLE statement is used to create a new table.

Syntax :

```
CREATE TABLE table_name (  
    column1 datatype1,  
    column2 datatype2,  
    Primary Key (column)  
);
```

ALTER

- The ALTER TABLE statement is used to add, delete, or modify columns in an existing table.

Syntax :

ALTER TABLE table_name

ADD column_name datatype

ALTER TABLE table_name

DROP COLUMN column_name

ALTER TABLE table_name

ALTER COLUMN column_name datatype

DROP

- The SQL DROP statement is used to remove a table definition and all data, indexes, triggers, constraints, and permissions for that table.

Syntax :

DROP TABLE table_name

Data Manipulation Language(DML)

INSERT Query

- The SQL **INSERT INTO** Statement is used to add new rows of data to a table in the database.

Syntax :

INSERT INTO Table_Name (c1, c2, c3...cn)

VALUES (v1, v2, v3... vn);

INSERT Example:

- INSERT INTO CUSTOMERS
(ID,NAME,AGE,ADDRESS,SALARY) VALUES (1,
'Ramesh', 32, 'Ahmedabad', 2000.00);
- INSERT INTO CUSTOMERS
(ID,NAME,AGE,ADDRESS,SALARY) VALUES (2,
'Khilan', 25, 'Delhi', 1500.00);
- INSERT INTO CUSTOMERS
(ID,NAME,AGE,ADDRESS,SALARY) VALUES (3,
'kaushik', 23, 'Kota', 2000.00);
- INSERT INTO CUSTOMERS
(ID,NAME,AGE,ADDRESS,SALARY) VALUES (4,
'Chaitali', 25, 'Mumbai', 6500.00);

UPDATE Query

- The SQL **UPDATE** Query is used to modify the existing records in a table.
- You can use WHERE clause with UPDATE query to update selected rows otherwise all the rows would be effected.

UPDATE Query

Syntax:

UPDATE table_name

SET column1 = value1, column2 = value2..., columnN = valueN **WHERE** [condition];

Example:

```
UPDATE CUSTOMERS SET ADDRESS = 'Pune', SALARY  
= 1000.00;
```

DELETE Query

- The SQL **DELETE** Query is used to delete the existing records from a table.
- You can use WHERE clause with DELETE query to delete selected rows, otherwise all the records would be deleted.

DELETE Query

Syntax:

DELETE FROM table_name **WHERE** [condition];

Example:

DELETE FROM CUSTOMERS WHERE ID = 6;

If you want to DELETE all the records from CUSTOMERS table

DELETE FROM CUSTOMERS;

SELECT Query

- SQL **SELECT** Statement is used to fetch the data from a database table which returns data in the form of result table. These result tables are called result-sets.

Syntax:

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

SELECT Example:

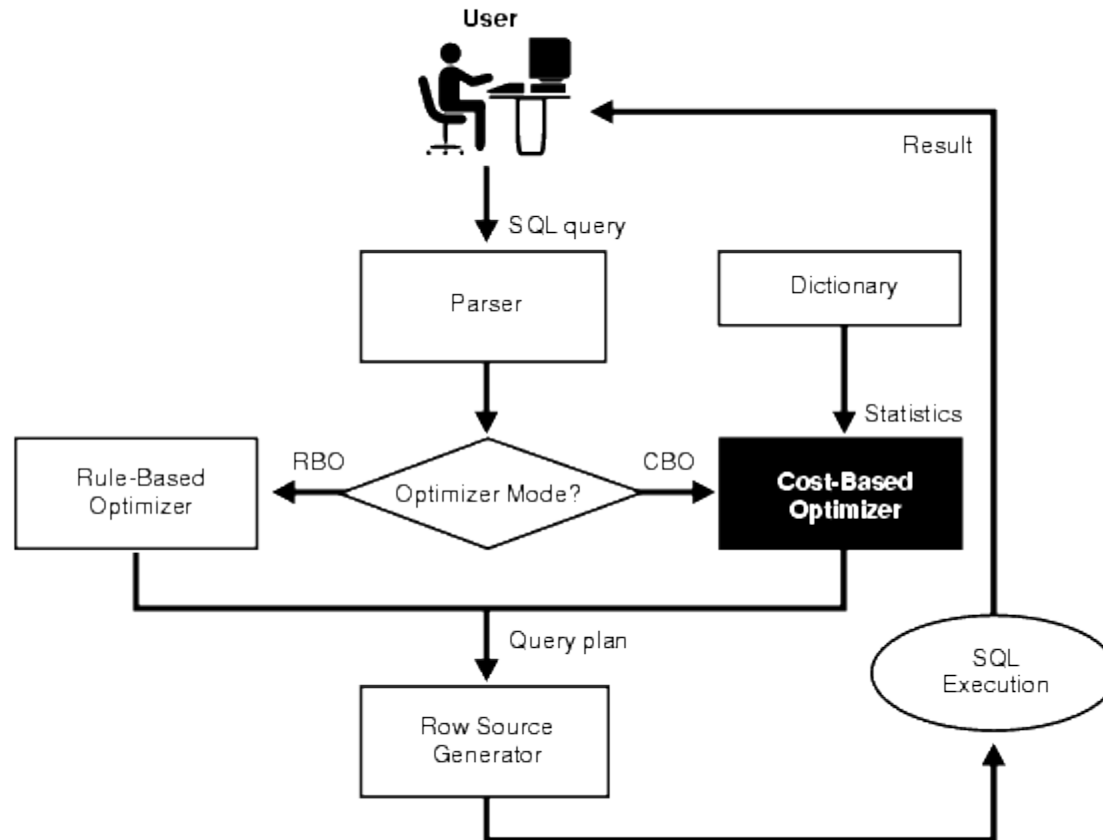
- To display entire table

```
SELECT * FROM table_name;
```

To display partial table

```
SELECT TOP 10 * FROM table_name;
```

SQL Processing Architecture



Thank You

Thank You

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