What is SQL Subquery?

In SQL, a subquery can be defined as a query **embedded** within **another query**. It is often used in the **WHERE**, **HAVING**, or **FROM** clauses of a statement. Subqueries are commonly used with **SELECT**, **UPDATE**, INSERT, and **DELETE** statements to achieve **complex filtering** and **data manipulation**.

Syntax

```
SELECT column_name
FROM table_name
WHERE column_name expression operator
   (SELECT column_name FROM table_name WHERE ...);
```

Key Characteristics of Subqueries

1. **Nested Structure**: A subquery is executed within the context of an outer query.
2. **Parentheses**: Subqueries must always be enclosed in parentheses.
3. **Comparison Operators**: Subqueries can be used with operators like =, >, <, IN, NOT IN, LIKE, etc.
4. **Single-Row vs. Multi-Row Subqueries**: Subqueries may return a single value (e.g., a single row) or multiple values.

Common SQL Clauses for Subqueries

1. WHERE Clause

Subqueries in the WHERE clause help filter data based on the results of another query. For example, you can filter records based on values returned by a subquery.

2. FROM Clause

Subqueries can be used in the **FROM** clause to treat the result of the subquery as a derived table, which can then be joined with other tables.

3. HAVING Clause

Subqueries in the **HAVING** clause allow you to filter grouped data after aggregation has occurred.

Examples of SQL Subqueries

NAME	ROLL_NO	LOCATION	PHONE_NUMBER
Ram	101	Chennai	9988775566
Raj	102	Coimbatore	8877665544
Sasi	103	Madurai	7766553344
Ravi	104	Salem	8989898989
Sumathi	105	Kanchipuram	8989856868

Database Table

NAME	ROLL_NO	SECTION
Ravi	104	A
Sumathi	105	B
Raj	102	A

Student Table

Example 1: Fetching Data Using Subquery
Query:
SELECT NAME, LOCATION, PHONE_NUMBER
FROM DATABASE
WHERE ROLL_NO IN (
SELECT ROLL_NO FROM STUDENT WHERE SECTION='A'
);
Output

NAME	LOCATION	PHONE_NUMBER
Ravi	Salem	8989898989
Raj	Coimbatore	8877665544

Example 2: Using Subquery with INSERT
Student1 Table

NAME	ROLL_NO	LOCATION	PHONE_NUMBER
Ram	101	chennai	9988773344
Raju	102	coimbatore	9090909090
Ravi	103	salem	8989898989

Student2 Table

NAME	ROLL_NO	LOCATION	PHONE_NUMBER
Raj	111	chennai	8787878787
Sai	112	mumbai	6565656565
Sri	113	coimbatore	7878787878

Query:
INSERT INTO Student1
SELECT * FROM Student2;

Output

NAME	ROLL_NO	LOCATION	PHONE_NUMBER
Ram	101	chennai	9988773344
Raju	102	coimbatore	9090909090
Ravi	103	salem	8989898989
Raj	111	chennai	8787878787
Sai	112	mumbai	6565656565
Sri	113	coimbatore	7878787878

Example 3: Using Subquery with DELETE
Query:
DELETE FROM Student2
WHERE ROLL_NO IN (SELECT ROLL_NO
         FROM Student1
         WHERE LOCATION = 'chennai');

Output

NAME	ROLL_NO	LOCATION	PHONE_NUMBER
Sai	112	mumbai	6565656565
Sri	113	coimbatore	7878787878

Example 4: Using Subquery with UPDATE

Query:
```
UPDATE Student2
SET NAME='geeks'
WHERE LOCATION IN (SELECT LOCATION
        FROM Student1
        WHERE NAME IN ('Raju', 'Ravi'));
```

Output

NAME	ROLL_NO	LOCATION	PHONE_NUMBER
Sai	112	mumbai	6565656565
geeks	113	coimbatore	7878787878