What is Subquery?State different Types of. Subqueries.

In SQL a Subquery can be simply defined as a query within another query. In other words we can say that a Subquery is a query that is embedded in WHERE clause of another SQL query.
Important rules for Subqueries:
You can place the Subquery in a number of SQL clauses: where clause,Having clause, From clause.

- **Types of Subqueries:**
  - **Single-Row Subquery:**
    - Returns zero or one row to the outer query.
    - Example:

```
SELECT column1 FROM table1 WHERE column2 = (SELECT column3 FROM table2 WHERE condition);
```

  - **Multiple-Row Subquery:**
    - Returns multiple rows to the outer query.
    - Example:

```
SELECT column1 FROM table1 WHERE column2 IN (SELECT column3 FROM table2 WHERE condition);
```

  - **Correlated Subquery:**
    - References columns from the outer query in its WHERE or HAVING clause.
    - Example:

```
SELECT column1 FROM table1 t1 WHERE EXISTS (SELECT * FROM table2 t2 WHERE t2.column = t1.column);
```

Can we update or delete record using Subquery? Explain with Example.

Yes, subqueries can be used in DML (Data Manipulation Language) statements like INSERT, UPDATE, and DELETE to retrieve or manipulate data based on conditions specified in the subquery.

Update example:

```
UPDATE employees e

SET salary = salary * 1.10

WHERE department_id IN (

 SELECT department_id

 FROM departments

WHERE department_name = 'Sales' );
```

In this example, the subquery selects the `department_id` from the `departments` table where the department name is 'Sales'. The outer query then updates the `salary` of employees who are in those departments by increasing it by 10%.

DELETE EXAMPLE:

```
DELETE FROM employees

WHERE department_id IN (

SELECT department_id

 FROM employees

GROUP BY department_id

HAVING COUNT(employee_id) < 10 );
```

In this example, the subquery calculates the number of employees in each department and selects the `department_id` for departments with fewer than 10 employees. The outer query then deletes employees who belong to these departments.

What are the limitations of Subquery?

Sure! Here are the key limitations of subqueries in short:

1. **Performance Issues:** Can be slow, especially with large datasets or deep nesting.
2. **Readability:** Complex and nested subqueries can be difficult to read and maintain.

3. **Limited Functionality:** Some database systems have restrictions or limited support for certain subquery features.
4. **Scalability:** Deeply nested subqueries may not scale well with large data volumes.
5. **Database-Specific Variations:** Syntax and capabilities may differ between database systems.

In practice, you may need to optimize or rewrite subqueries using joins, CTEs, or other methods for better performance and clarity.