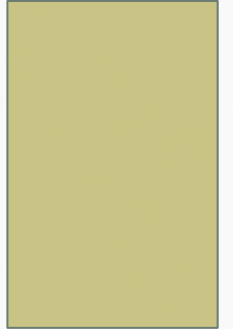# NESTED QUERIES

PREPARED BY
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NESTED QUERIES (SUBQUERIES)

- A **subquery(inner query)** is a SQL query nested inside a **another query(outer query)**

- A subquery **may occur in** :
  - ❑ SELECT clause of outer query
  - ❑ FROM clause of outer query
  - ❑ WHERE clause of outer query (most commonly used)

- A subquery **can be nested inside**:
  - ❑ SELECT statement
  - ❑ INSERT statement
  - ❑ UPDATE statement
  - ❑ DELETE statement
  - ❑ another subquery.

BASIC SYNTAX

```
SELECT      select_list
FROM        table
WHERE       expr operator

            (SELECT    select_list
             FROM      table);
```

EXECUTION ORDER

- Inner query evaluated independently of the outer query
- Inner query is executed first
- Inner query is executed only one time
- The result of inner query is then passed to outer query for further processing

OPERATORS USUALLY USED

- Comparison operator
  - ❑ <
  - ❑ >
  - ❑ =
  - ❑ <=
  - ❑ >=
  - ❑ <>
- Multiple row comparison operator
  - ❑ IN
  - ❑ ANY (SOME)
  - ❑ ALL

EXAMPLES

- SELECT clause

```
SELECT
    Name, Age, (SELECT Grade FROM StudentCourseGrade WHERE StudentId = st.StudentId)
FROM
    Student as st
```

- FROM clause

```
SELECT
    Name
FROM
    (
        SELECT
            *
        FROM
            Student
    ) as x
```

- WHERE clause

```
SELECT
    Name
FROM
    Student
WHERE
    StudentId IN (SELECT StudentId FROM StudentCourseGrade WHERE Grade = 'A')
```

EXAMPLES

- INSERT statement

```
INSERT INTO Student_Bkp
SELECT * FROM Student WHERE StudentId IN (SELECT StduentId FROM Student)
```

- UPDATE statement

```
UPDATE Student SET Department = 'CS'
WHERE StudentId IN (SELECT StudentId FROM Student_Bkp WHERE Department = 'CS')
```

- DELETE statement

```
DELETE FROM Student
WHERE StudentId IN (SELECT StudentId FROM Student_Bkp WHERE Department = 'CS')
```

CORRELATED NESTED QUERIES

- A subquery can contains reference to the table of the outer query(outer reference)
- The subquery which contains the outer reference is called correlated subquery

EXECUTION ORDER

- Correlated subquery cannot be evaluated independently of the outer query.

- Because the correlated subquery uses the values of the outer query, so the outer query is executed first

- Correlated query is executed for every row of the outer query

QUESTION

- Can you figure out correlated subquery from Slide 6 Examples?

POINTS TO REMEMBER

- Subquery must be enclosed in parentheses
- Subquery must be placed on right side of comparison operator
- Use single-row operators with single-row subqueries
- If the WHERE clause of an outer query includes a column name, it must be join-compatible with the column in the subquery select list.
- ORDER BY can only be specified in subquery if TOP is also specified
- In correlated nested queries, a table alias must be used to specify which table reference is to be used.