6

Writing Correlated Subqueries

ORACLE®

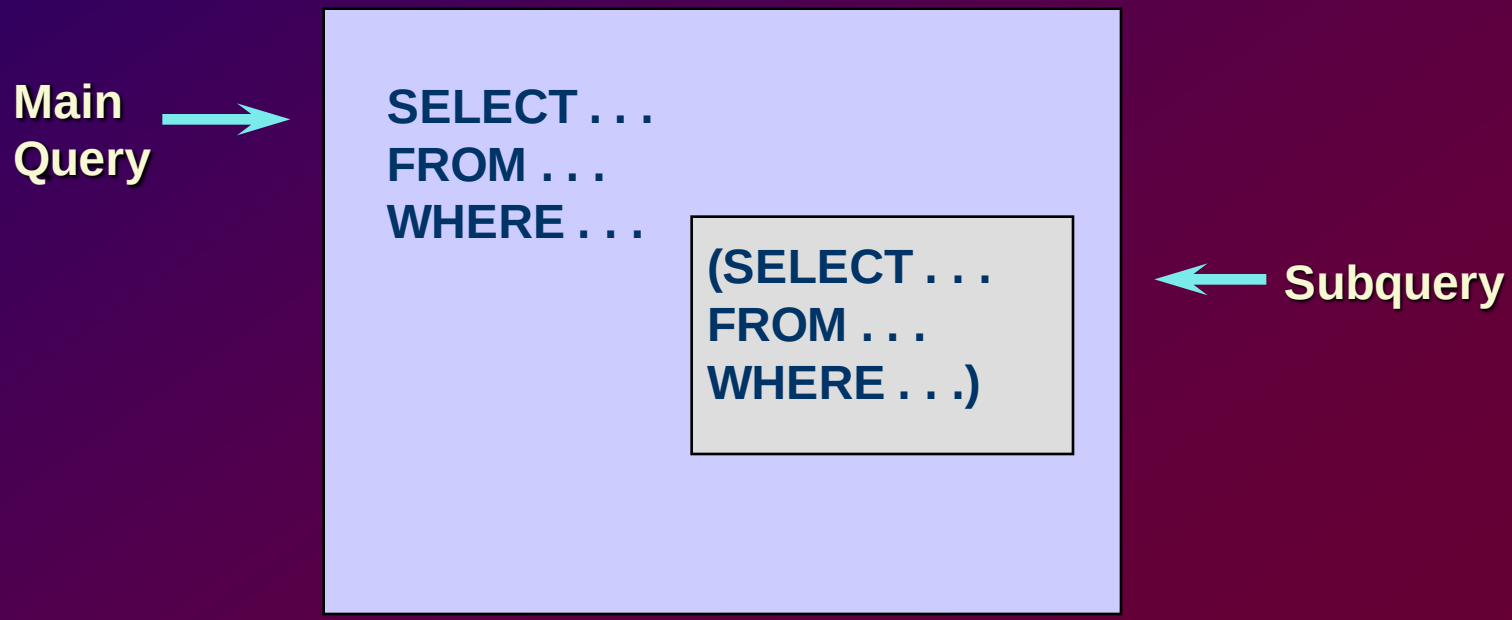
Objectives

After completing this lesson, you should be able to do the following:

- Describe the types of problems that can be solved with correlated subqueries
- Write correlated subqueries
- Use the EXISTS and NOT EXISTS operators
- Update and delete rows using correlated subqueries

What Is a Subquery?

A subquery is a SELECT statement embedded in a clause of another SQL statement.



Subqueries

```
SELECT    select_list
FROM      table
WHERE     expr operator (SELECT     select_list
                         FROM       table);
```

- The subquery (inner query) executes once before the main query.
- The result of the subquery is used by the main query (outer query).

Using a Subquery

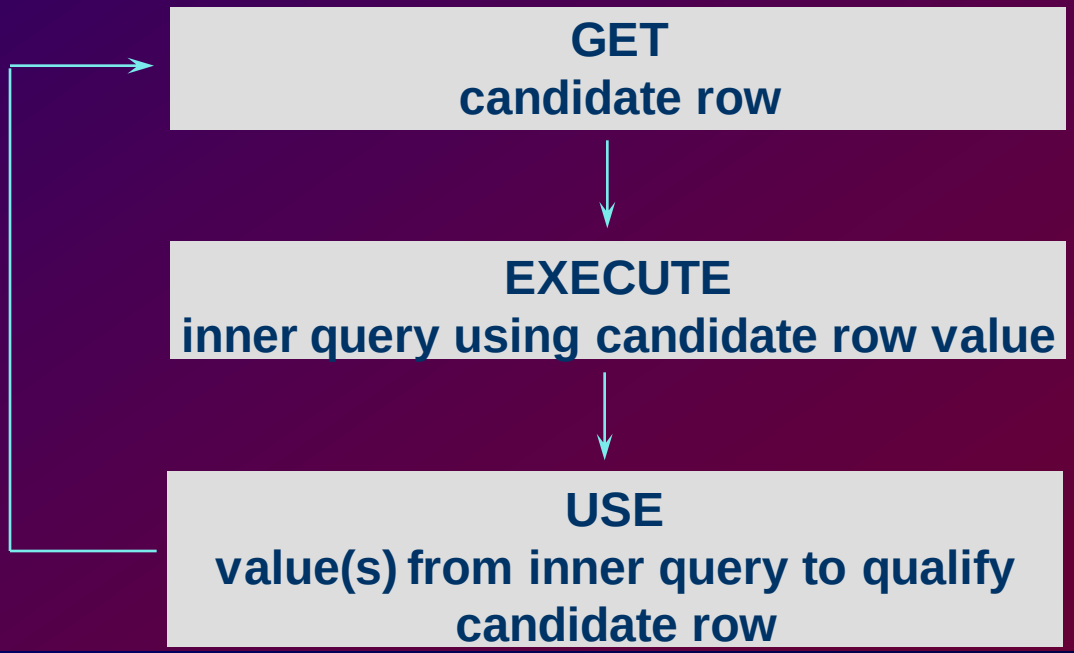
```
SQL> SELECT ename
  2  FROM   emp
  3  WHERE  sal >
  4                (SELECT sal
  5                 FROM   emp
  6                 WHERE  empno = 7566);
```

2975

```
ENAME
----------
KING
FORD
SCOTT
```

Correlated Subqueries

Used to affect row-by-row processing, each subquery is executed once for every row of the outer query.



Correlated Subqueries

```
SELECT outer1, outer2, ...
FROM   table1 alias1
WHERE  outer1 operator
                    (SELECT inner1
                    FROM    table2 alias2
                    WHERE   alias1.outer2 =
                            alias2.inner1);
```

The subquery references a column from a table in the parent query.

Using Correlated Subqueries

Find all employees who make more than the average salary in their department.

```
SQL> SELECT empno, sal, deptno
  2  FROM   emp outer
  3  WHERE  sal > (SELECT AVG(sal)
  4                FROM   emp inner
  5                WHERE  outer.deptno = inner.deptno);
```

Each time the outer query is processed the inner query is evaluated.

```
    EMPNO        SAL     DEPTNO
--------- ---------- ----------
     7839       5000         10
     7698       2850         30
     7566       2975         20
 ...
 6 rows selected.
```

Using the EXISTS Operator

- If a subquery row value is found:
  - The search does not continue in the inner query.
  - The condition is flagged TRUE.
- If a subquery row value is not found:
  - The condition is flagged FALSE.
  - The search continues in the inner query.

Using the EXISTS Operator

Find employees who have at least one person reporting to them.

```
SQL> SELECT empno, ename, job, deptno
  2  FROM   emp outer
  3  WHERE  EXISTS (SELECT empno
  4                 FROM   emp inner
  5                 WHERE  inner.mgr = outer.empno);
```

```
     EMPNO ENAME      JOB           DEPTNO
---------- ---------- --------- ----------
      7839 KING       PRESIDENT         10
      7698 BLAKE      MANAGER           30
      7782 CLARK      MANAGER           10
      7566 JONES      MANAGER           20
...
6 rows selected.
```

Using the NOT EXISTS Operator

Find all departments that do not have any employees.

```
SQL> SELECT   deptno, dname
  2  FROM     dept d
  3  WHERE    NOT EXISTS (SELECT '1'
  4                       FROM   emp e
  5                       WHERE  d.deptno = e.deptno);
```

```
    DEPTNO DNAME
---------- ----------
        40 OPERATIONS
```

Correlated UPDATE

```
UPDATE table1 alias1
SET    column = (SELECT expression
                 FROM   table2 alias2
                 WHERE  alias1.column = alias2.column);
```

Use a correlated subquery to update rows in one table based on rows from another table.

Correlated DELETE

```
DELETE FROM table1 alias1
WHERE  column operator
            (SELECT expression
            FROM   table2 alias2
             WHERE  alias1.column = alias2.column);
```

Use a correlated subquery to delete only those rows that also exist in another table.

Summary

- Correlated subqueries are useful whenever a subquery must return a different result for each candidate row.
- The EXISTS operator is a Boolean operator, testing the presence of a value.
- Correlated subqueries can be used with SELECT, UPDATE, and DELETE statements.

Practice Overview

- Writing correlated subqueries
- Using the EXISTS operator