10-1: Fundamentals of Subqueries

Practice Activities

Objectives

- Define and explain the purpose of subqueries for retrieving data
- Construct and execute a single-row subquery in the WHERE clause
- Distinguish between single-row and multiple-row subqueries

Vocabulary

Identify the vocabulary word for each definition below.

	It accepts a value from the inner query to complete its SELECT statement.
	An inner query that returns one or more rows to the outer query
	An inner query that is nested within an outer query
	An inner query that compares multiple columns at the same time
	An inner query that returns only one row to the outer query
	An inner query that compares the multiple columns one at a time in different subqueries
	Another name for a subquery

Try It / Solve It

1. What is the purpose of using a subquery?
2. What is a subquery?
3. What DJs on Demand d_play_list_items song_id's have the same event_id as song_id 45?
4. Which events in the DJs on Demand database cost more than event_id = 100?
5. Find the track number of the song that has the same CD number as "Party Music for All Occasions."

List the DJs on Demand events whose theme code is the same as the code for "Tropical."

What are the names of the Global Fast Foods staff members whose salaries are greater than the staff member whose ID is 12?

8. What are the names of the Global Fast Foods staff members whose staff types are not the same as Bob Miller's?
9. Which Oracle employees have the same department ID as the IT department?
10. What are the department names of the Oracle departments that have the same location ID as Seattle?
11. Indicate whether the statement regarding subqueries is True or False.

a. It is good programming practice to place a subquery on the right side of the comparison operator.

b. A subquery can reference a table that is not included in the outer query's FROM clause.

c. Single-row subqueries can return multiple values to the outer query.

10-2: Single-Row Subqueries

Practice Activities

Objectives

- Construct and execute a single-row subquery in the WHERE clause or HAVING clause
- Construct and execute a SELECT statement using more than one subquery
- Construct and execute a SELECT statement using a group function in the subquery

Try It / Solve It

1. Write a query to return all those employees who have a salary greater than that of Lorentz and are in the same department as Abel.
2. Write a query to return all those employees who have the same job id as Rajs and were hired after Davies.

3. What DJs on Demand events have the same theme code as event ID = 100?
What is the staff type for those Global Fast Foods jobs that have a salary less than those of any Cook staff-type jobs?
4. Write a query to return a list of department id's and average salaries where the department's average salary is greater than Ernst's salary.
5. Return the department ID and minimum salary of all employees, grouped by department ID, having a minimum salary greater than the minimum salary of those employees whose department ID is not equal to 50.

10-3: Multiple-Row Subqueries

Practice Activities

Objectives

- Correctly use the comparison operators IN, ANY, and ALL in multiple-row subqueries
- Describe what happens if a multiple-row subquery returns a null value
- Construct and execute a multiple-row subquery in the WHERE clause or HAVING clause
- Understand when multiple-row subqueries should be used, and when it is safe to use a single-row subquery
- Distinguish between pair-wise and non-pair-wise subqueries
- Create a query using the EXISTS and NOT EXISTS operators to test for returned rows from the subquery

Try It / Solve It

1. What will be returned by a query if it has a subquery that returns a null ?
2. Write a query that returns jazz and pop songs. Write a multi-row subquery and use the d_songs and d_types tables. Include the id, title, duration, and the artist name.
3. Find the last names of all employees whose salaries are the same as the minimum salary for any department.
4. Which Global Fast Foods employee earns the lowest salary? Hint: You can use either a single-row or a multiple-row subquery.
5. Place the correct multiple-row comparison operators in the outer query WHERE clause of each of the following:

a. Which CDs in our d_cds collection were produced before "Carpe Diem" was produced?
WHERE year (SELECT year ...

b. Which employees have salaries lower than any one of the programmers in the IT department?
WHERE salary (SELECT salary ...

c. What CD titles were produced in the same year as "Party Music for All Occasions" or "Carpe Diem"?
WHERE year (SELECT year ...

d. What song title has a duration longer than every type code 77 title?
WHERE duration (SELECT duration ...

6. If each WHERE clause is from the outer query, which of the following are true?

a. WHERE size > ANY -- If the inner query returns sizes ranging from 8 to 12, the value 9 could be returned in the outer query.

b. WHERE book_number IN -- If the inner query returns books numbered 102, 105, 437, and 225 then 325 could be returned in the outer query.

c. WHERE score <= ALL -- If the inner query returns the scores 89, 98, 65, and 72, then 82 could be returned in the outer query.

d. WHERE color NOT IN -- If the inner query returns red, green, blue, black, and then the outer query could return white.

e. WHERE game_date = ANY -- If the inner query returns 05-Jun-1997, 10-Dec-2002, and 2-Jan-2004, then the outer query could return 10-Sep-2002.

7. The goal of the following query is to display the minimum salary for each department whose minimum salary is less than the lowest salary of the employees in department 50. However, the subquery does not execute because it has five errors. Find them, correct them, and run the query.
SELECT department_id FROM employees WHERE MIN(salary)
HAVING MIN(salary) > GROUP BY department_id SELECT MIN(salary) WHERE department_id < 50;
8. Which statements are true about the subquery below?

```
SELECT employee_id, last_name FROM employees
WHERE salary = (SELECT MIN(salary) FROM employees
GROUP BY department_id);
```

a. The inner query could be eliminated simply by changing the WHERE clause to WHERE MIN(salary).
b. The query wants the names of employees who make the same salary as the smallest salary in any department.
c. The query first selects the employee ID and last name, and then compares that to the salaries in every department.
d. This query will not execute.
9. Write a pair-wise subquery listing the last_name, first_name, department_id, and man-ager_id for all employees that have the same department_ id and manager_id as employee 141. Exclude employee 141 from the result set.
10. Write a non-pair-wise subquery listing the last_name, first_name, department_id, and manager_id for all employees that have the same department_ id and manager_id as employee 141

10-4: Correlated Subqueries

Practice Activities
Objectives

- Identify when correlated subqueries are needed
- Construct correlated subqueries
- Construct named subqueries using the WITH clause

Try It / Solve It

1. Explain the main difference between correlated and non-correlated subqueries?

2. Write a query that lists the highest earners for each department. Include the last_name, department_id, and the salary for each employee.

3. Examine the following select statement and finish it so that it will return the last_name, department_id, and salary of employees who have at least one person reporting to them. So we are effectively looking for managers only. In the partially written SELECT statement, the WHERE clause will work as it is. It is simply testing for the existence of a row in the subquery.

SELECT (enter columns here) FROM (enter table name here) outer WHERE 'x' IN (SELECT 'x'
FROM (enter table name here) inner
WHERE inner(enter column name here) = inner(enter column name here) Finish off the statement by sorting the rows on the department_id column.

4. Using a WITH clause, write a SELECT statement to list the job_title of those jobs whose maximum salary is more than half the maximum salary of the entire company. Name your subquery MAX_CALC_SAL. Name the columns in the result JOB_TITLE and JOB_TOTAL, and sort the result on JOB_TOTAL in descending order.

Hint: Examine the jobs table. You will need to join JOBS and EMPLOYEES to display the job_title.