Database Programming with SQL
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 manager_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.