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Database Programming: Sections 10, 11

Correlated Subquery	It accepts a value from the inner query to complete its SELECT statement.
Non-correlated Subquery	An inner query that returns one or more rows to the outer query
Subquery	An inner query that is nested within an outer query
Row Subquery	An inner query that compares multiple columns at the same time
Scalar Subquery	An inner query that returns only one row to the outer query
Column Subqueries	An inner query that compares the multiple columns one at a time in different subqueries
Inner Query	Another name for a subquery

1. What is the purpose of using a subquery?
    a. The purpose of a subquery is to allow for more complex queries as a query will be embedded within another query.
2. What is a subquery?
    a. A select statement that is embedded in the clause of another SELECT statement
3. What DJs on Demand d_play_list_items song_id's have the same event_id as song_id 45?
    a. SELECT event_id from d_play_list_items
    WHERE event_id =
    (SELECT song_id from d__play_list_items where song_id = 45)

4. Which events in the DJs on Demand database cost more than event_id = 100?
    a. SELECT name from d_events
    b. WHERE cost >
    c. (SELECT costs from d_events where id = 100)

5. Find the track number of the song that has the same CD number as "Party Music for All Occasions."
    a. SELECT track, cd_number from d_track_listings
    WHERE track =
    (SELECT cd_number from d_track_listings where cd_number = 91)

6. List the DJs on Demand events whose theme code is the same as the code for "Tropical."
    a. SELECT track, cd_number from d_track_listings
       WHERE track =
    b. (SELECT cd_number from d_track_listings where cd_number = 91)

7. What are the names of the Global Fast Foods staff members whose salaries are greater than the staff member whose ID is 12?
    a. SELECT first_name, last_name, job_id
       FROM employees
       WHERE job_id !=
       (SELECT job_id
       FROM employees
       WHERE last_name = "Miller");

8. What are the names of the Global Fast Foods staff members whose staff types are not the same as Bob Miller's?
    a. SELECT first_name, last_name, job_id
       FROM employees
       WHERE job_id !=
       (SELECT job_id
       FROM employees
       WHERE last_name = "Miller");

9. Which Oracle employees have the same department ID as the IT department?
    a. SELECT first_name, last_name, department_id
       FROM employees
       WHERE department_id =
       (SELECT job_id
       FROM employees
       WHERE last_name = "Miller");

10. What are the department names of the Oracle departments that have the same location ID as Seattle?
    a. SELECT dapartment_name
       FROM employees
       WHERE dpartment_ID =
       (SELECT location_id
       FROM employees
       WHERE location = "Seattle");

11. Indicate whether the statement regarding subqueries is True or False.

a. True - It is good programming practice to place a subquery on the right side of the comparison operator.
b. False - A subquery can reference a table that is not included in the outer query's FROM clause.
c. True - Single-row subqueries can return multiple values to the outer query.

10-2

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.

```
SELECT First_name, last_name, salary
FROM employees
WHERE salary >
(SELECT salary
FROM employees
WHERE first_name = "Lorentz")
AND
department_id =
(select department_id
From employee
where laat_name = "abel" ;
```

2. Write a query to return all those employees who have the same job id as Rajs and were hired after Davies.

```
SELECT *
FROM employees
WHERE job_id = (SELECT job_id FROM employees WHERE name = 'Rajs')
  AND hire_date > (SELECT hire_date FROM employees WHERE name =
'Davies');
```

3. What DJs on Demand events have the same theme code as event ID = 100?

```
SELECT *
FROM events
WHERE theme_code = (SELECT theme_code FROM events WHERE event_id =
100);
```

4. What is the staff type for those Global Fast Foods jobs that have a salary less than those of any Cook staff-type jobs?

```
SELECT staff_type
FROM jobs
WHERE salary < (SELECT MIN(salary) FROM jobs WHERE staff_type = 'Cook');
```

5. 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.

```
SELECT department_id, AVG(salary) AS average_salary
FROM employees
GROUP BY department_id
HAVING AVG(salary) > (SELECT salary FROM employees WHERE name =
'Ernst');
```

6. 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.

```
SELECT department_id, MIN(salary) AS minimum_salary
FROM employees
GROUP BY department_id
HAVING MIN(salary) > (SELECT MIN(salary) FROM employees WHERE
department_id != 50);
```

10.3

1. What will be returned by a query if it has a subquery that returns a null?
   a. If IN or ANY are used, the outer query will return rows which match the non-null values, if all is used nothing is returned

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.

```
SELECT id, title, duration, artist_name
FROM d_songs
WHERE genre_id IN (SELECT genre_id FROM d_types WHERE genre_name IN
('Jazz', 'Pop'));
```

3. Find the last names of all employees whose salaries are the same as the minimum salary for any department.

```
 Select department_id, MIN(salary)
  From employees
  GROUP BY department_id
 HAVING MIN(salary) =
 (Select salary
  From employees
  Where department_id IN (10,20))
  ORDER BY department_id;
```

4. Which Global Fast Foods employee earns the lowest salary? Hint: You can use either a single-row or a multiple-row subquery.

```
Select department_id, MIN(salary), First_name, Last_name
 From employees
 GROUP BY department_id
 HAVING MIN(salary) = ANY
 (Select salary
 From employees
 Where department_id IN (10,20))
 ORDER BY department_id;
```

5. Place the correct multiple-row comparison operators in the outer query WHERE clause of each of the following:
    a. WHERE year < in (SELECT year ...
    b. WHERE salary < in (SELECT salary ...
    c. WHERE year in (SELECT year ...
    d. WHERE duration > (SELECT duration ...

6. If each WHERE clause is from the outer query, which of the following are true?
    a. True
    b. False
    c. True
    d. False
    e. True
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.
    a.
```
SELECT department_id
FROM employees
GROUP BY department_id
HAVING MIN(salary) >
(SELECT MIN(salary)
WHERE department_id < 50;)
WHERE MIN(salary)
```

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. True - The inner query could be eliminated simply by changing the WHERE clause to WHERE MIN(salary).
    b. False - The query wants the names of employees who make the same salary as the smallest salary in any department.

c. False - The query first selects the employee ID and last name, and then compares that to the salaries in every department.
d. False - 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.

    a. SELECT last_name, first_name, department_id, manager_id
    FROM employees
    WHERE department_id = (SELECT department_id FROM employees WHERE employee_id = 141)
    AND manager_id = (SELECT manager_id FROM employees WHERE employee_id = 141)
    AND employee_id != 141;

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.
    a. SELECT last_name, first_name, department_id, manager_id
    FROM employees
    WHERE (department_id, manager_id) =
    (SELECT department_id, manager_id
    FROM employees
    WHERE employee_id = 141);

10-4

1. Explain the main difference between correlated and non-correlated subqueries?
    a. A correlated subquery when the subquery references a column from a table referred to in the parent statement.
2. Write a query that lists the highest earners for each department. Include the last_name, department_id, and the salary for each employee.

```
SELECT o.first_name,
o.last_name, o.salary, o.department_id
FROM employees o
WHERE o.salary =
(SELECT MAX(i.salary)
FROM employees i
WHERE i.department_id =
o.department_id);
```

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.
    a. SELECT last_name,department_id,salary)
       FROM employees outer
       WHERE manager_id IN (SELECT manager_id
       FROM (manager) inner
       WHERE inner(manager_id) = inner(manager_id)
       order by department_id
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.