# Database Programming with SQL

## 10-1: Fundamentals of Subqueries

- 1. What is the purpose of using a subquery?
  - A subquery is used to provide a more specific result that can be utilized by the main (outer) query. It can perform tasks such as filtering, aggregating, or limiting data, allowing for more flexible and efficient queries.
     Subqueries are often used to isolate values for conditions, join on intermediate data, or simplify complex queries.
- 2. What is a subquery?
  - A subquery, also known as an inner query or nested query, is a query within another SQL query. It is placed inside parentheses within the main query and can return single values, multiple values, or even a complete set of rows that the outer query uses for further operations.
- 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."



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



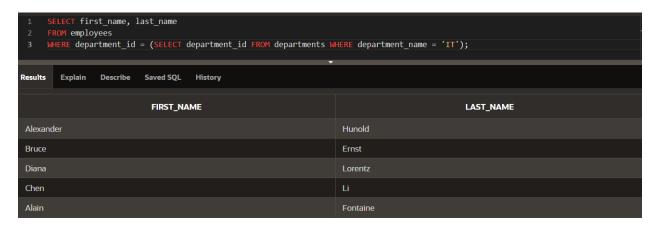
7. What are the names of the Global Fast Foods staff members whose salaries are greater than the staff member whose ID is 12?



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.
    - True
  - b. A subquery can reference a table that is not included in the outer query's FROM clause.
    - False
  - c. Single-row subqueries can return multiple values to the outer query.
    - False

## 10-2: Single Row Subqueries

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?



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?



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.



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.

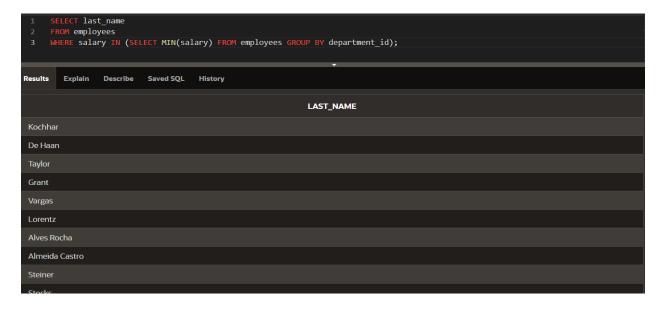


#### **10-3: Multiple Row Subqueries**

- 1. What will be returned by a query if it has a subquery that returns a null?
  - If a subquery returns NULL and is used in a condition, the condition will generally return NULL (or unknown), leading to no rows being returned unless handled specifically. For example, if the outer query uses a comparison like WHERE salary > (SELECT AVG(salary) FROM employees WHERE department\_id = 999), and the subquery yields NULL, the comparison will fail, and no rows will be 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.



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 < ANY (SELECT salary ...
  - c) What CD titles were produced in the same year as "Party Music for All Occasions" or "Carpe Diem"? WHERE year IN (SELECT year ...
  - d) What song title has a duration longer than every type code 77 title? WHERE duration > ALL (SELECT duration ...

# 10-3: Multiple Row Subqueries

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

#### • Correlated Subqueries:

- A correlated subquery is executed once for each row processed by the outer query.
- It references columns from the outer query, making it dependent on that outer query.

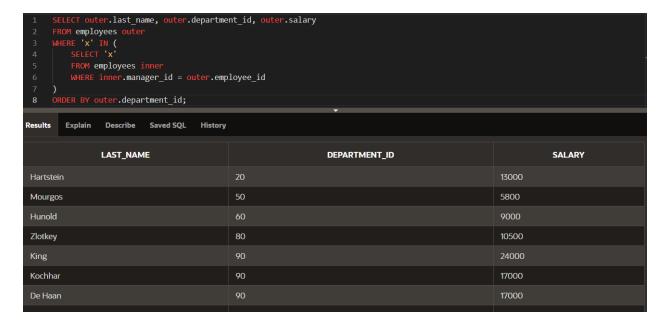
#### • Non-Correlated Subqueries:

- A non-correlated subquery is executed once and returns a result set that is independent of the outer query.
- o It does not reference any columns from the outer query.

2. Write a query that lists the highest earners for each department. Include the last name, department id, and the salary for each employee.

<pre>SELECT last_name, department_id, salary FROM employees e1  WHERE salary = ( SELECT MAX(salary) FROM employees e2 WHERE e1.department_id = e2.department_id  );</pre> Results Explain Describe Saved SQL History		
LAST_NAME	DEPARTMENT_ID	SALARY
Higgins	110	12000
King	90	24000
Saikawa	10	4400
Whalen	10	4400
Abel	80	11000
Barbosa Souza	85	9500
Hartstein	20	13000
Mourgos	50	5800

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.

