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HHA 507

SQL Database Programming: Section 10-1: Fundamentals of Subqueries

Vocabulary

SUBQUERY – It accepts a value from the inner query to complete its SELECT statement.

MULTIPLE-ROW SUBQUERIES – An inner query that returns one or more rows to the outer query

SUBQUERY – An inner query that is nested within an outer query

MULTIPLE-ROW SUBQUERIES – An inner query that compares multiple columns at the same time

SINGLE-ROW SUBQUERIES – An inner query that returns only one row to the outer query

INNER QUERY – Another name for a subquery

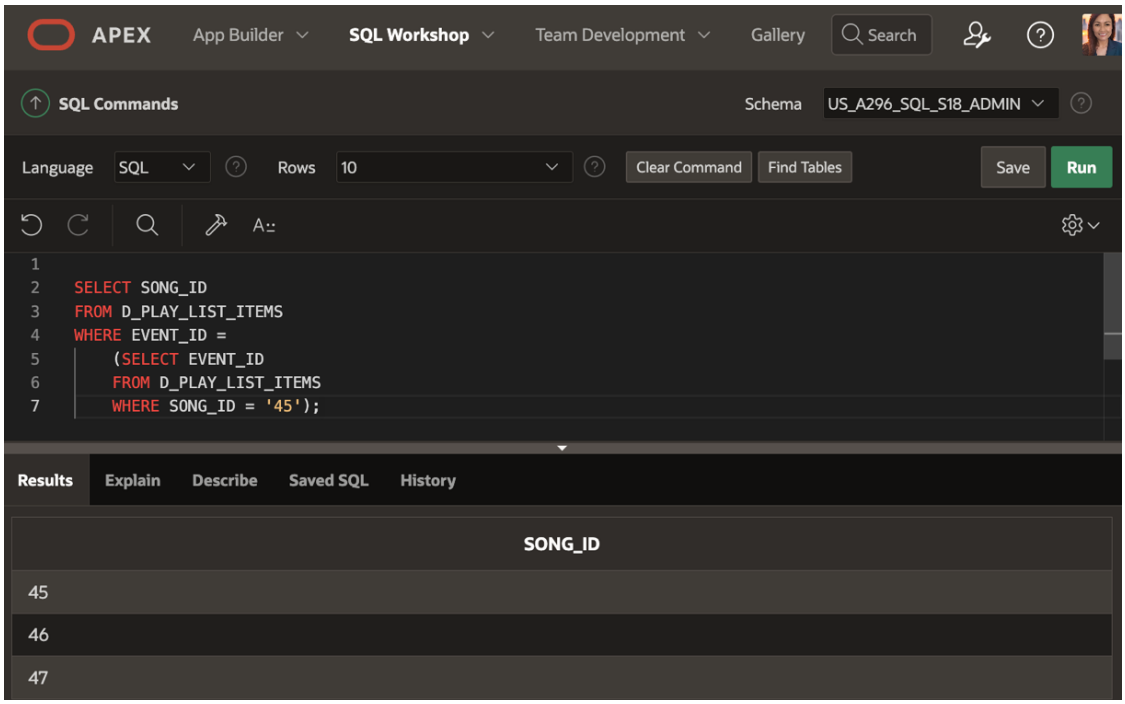
Try It/ Solve It

1. What is the purpose of using a subquery?
   - "In SQL, subqueries enable us to find the information we need so that we can get the information we want." (Oracle, 2020)

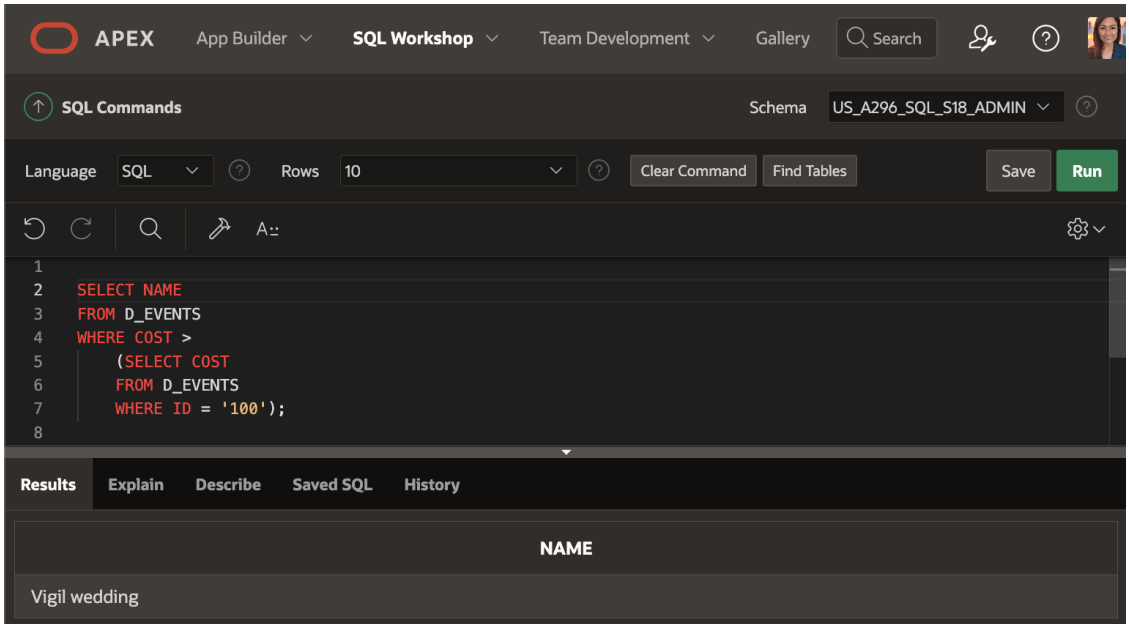
2. What is a subquery?
   - "A subquery is a SELECT statement that is embedded in a clause of another SELECT statement." (Oracle, 2020) It's like a query inside another query. The subquery or the inner query runs first, and its result will be used by the outer query.

<<< MORE ANSWERS CONTINUE ON THE NEXT PAGE >>>

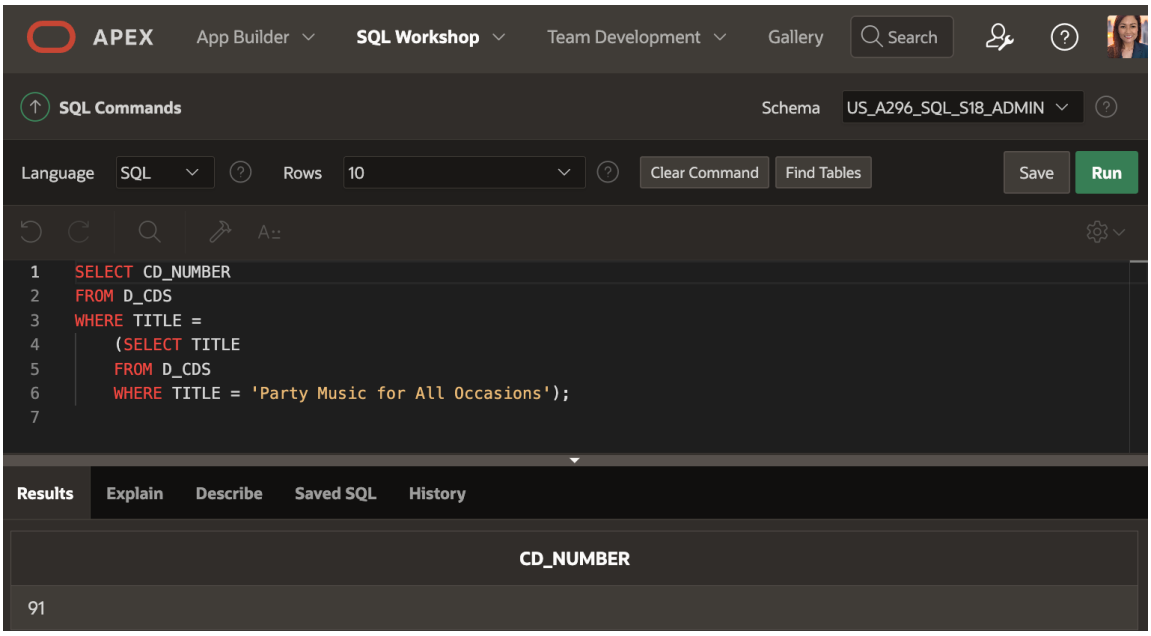
3. What DJs on Demand d_play_list_items song_id's have the **same event_id** as song_id 45?



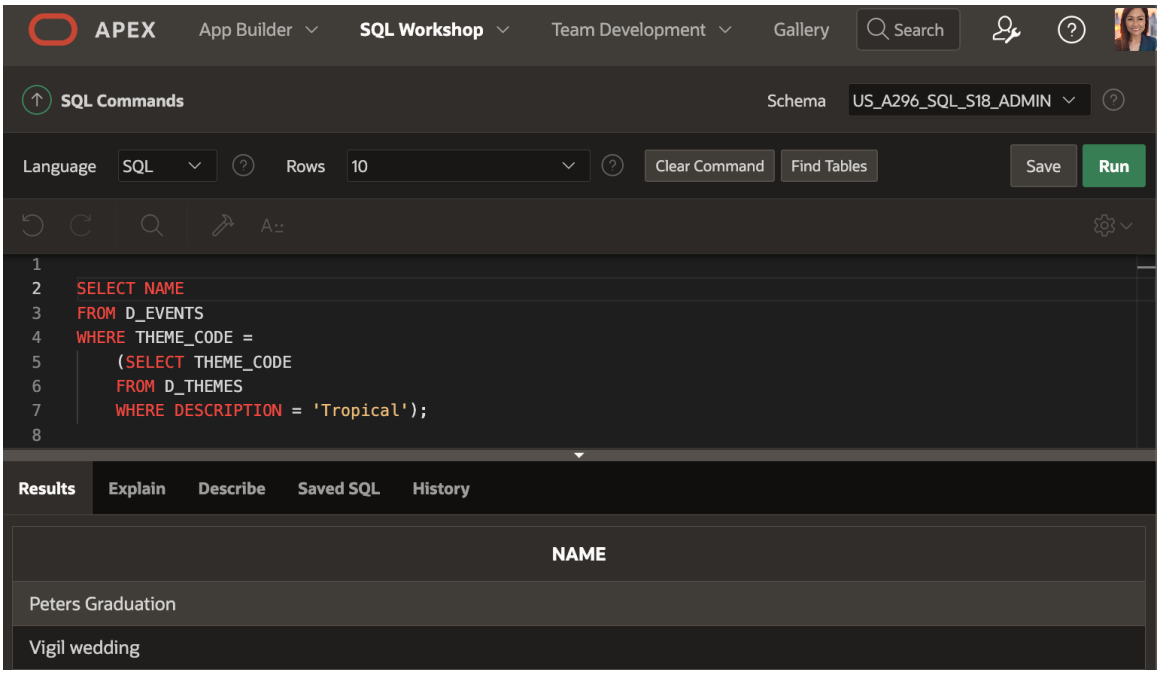
4. Which events in the DJs on Demand database cost more than event_id = 100?



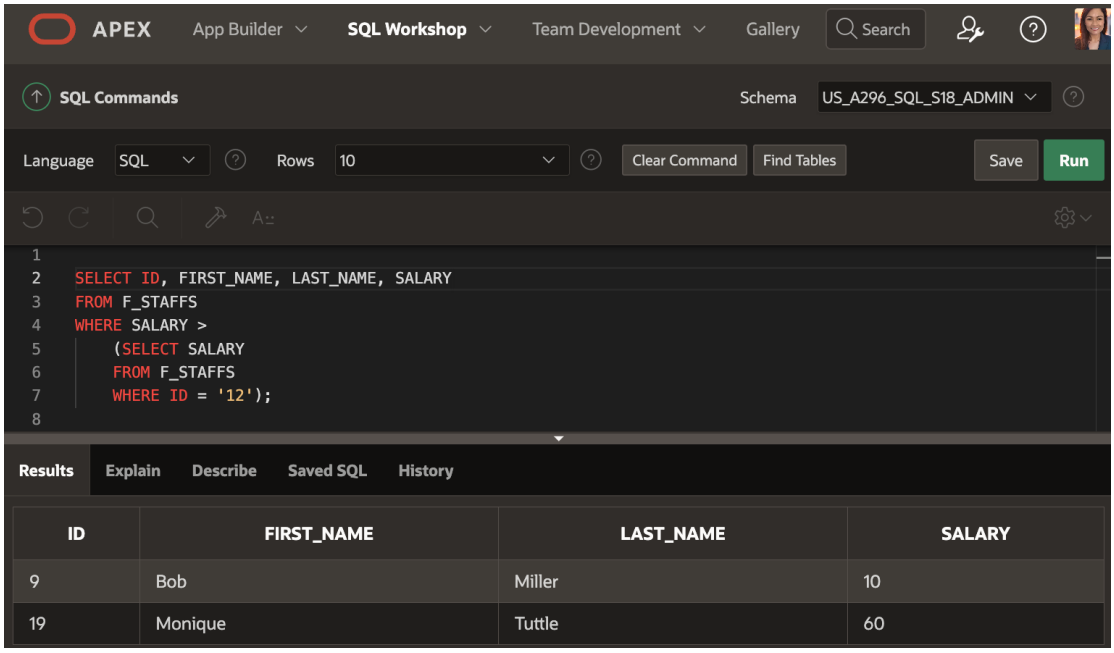
5. Find the track number of the song that has the same CD number as "Party Music for All Occasions."



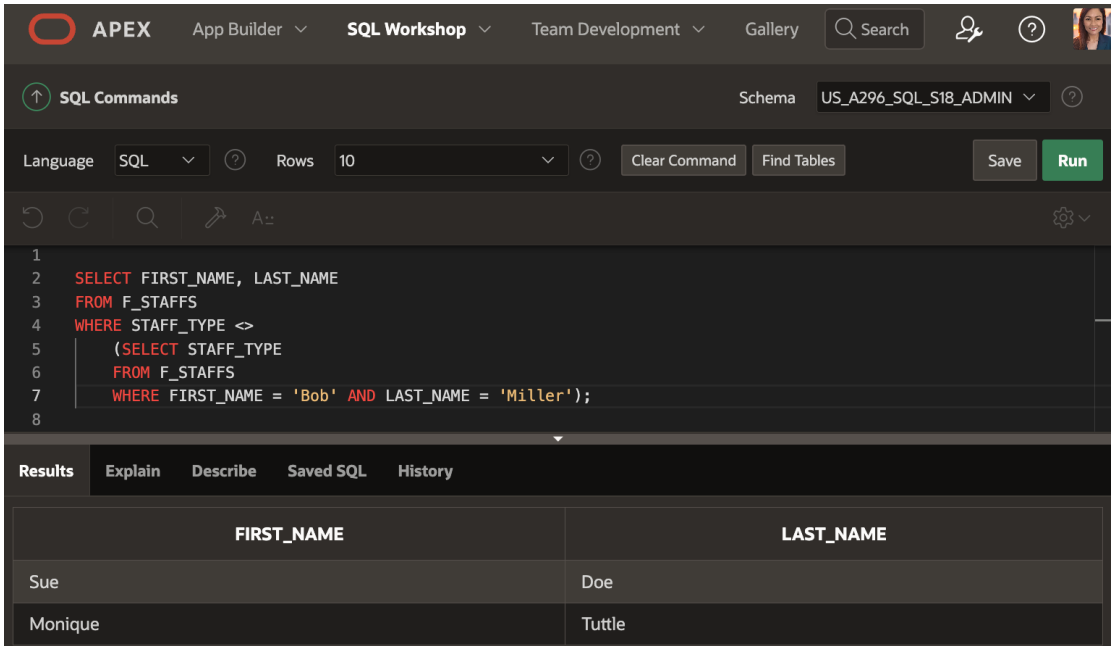
6. List the DJs on Demand events whose theme code is the same as the code for "Tropical."



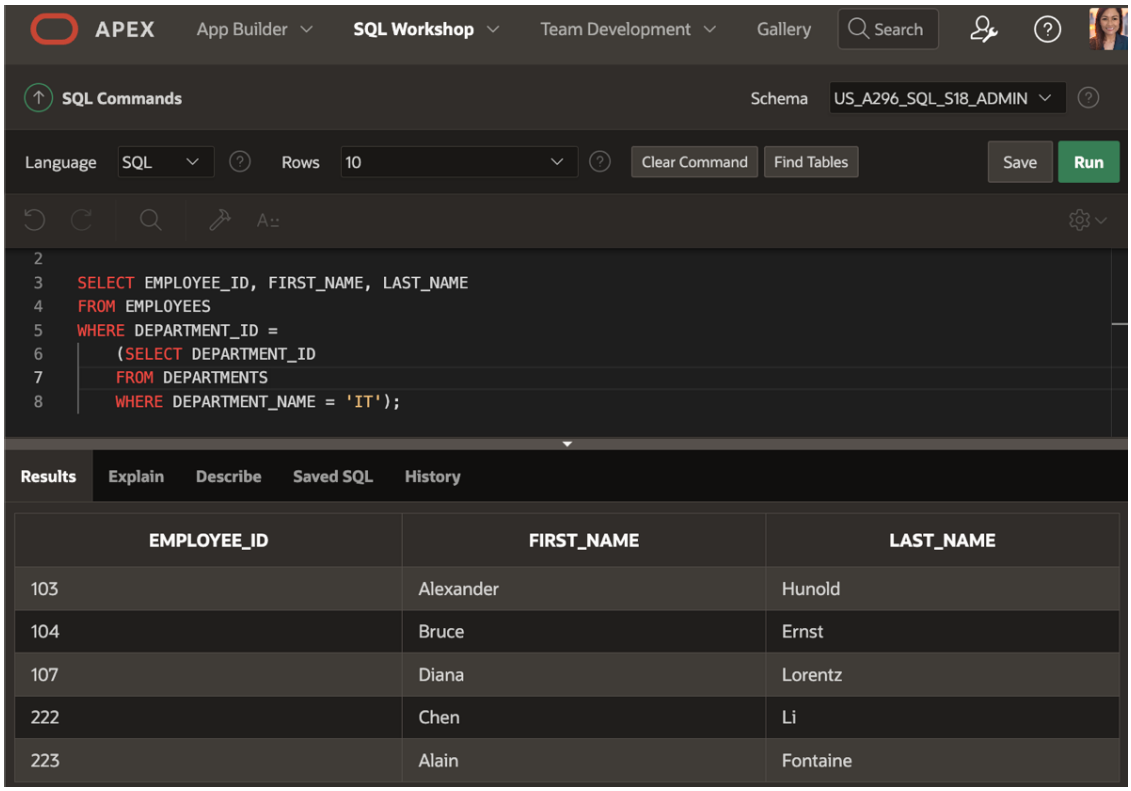
7. What are the names of the Global Fast Foods staff members whose salaries are greater than the staff member whose ID is 12?



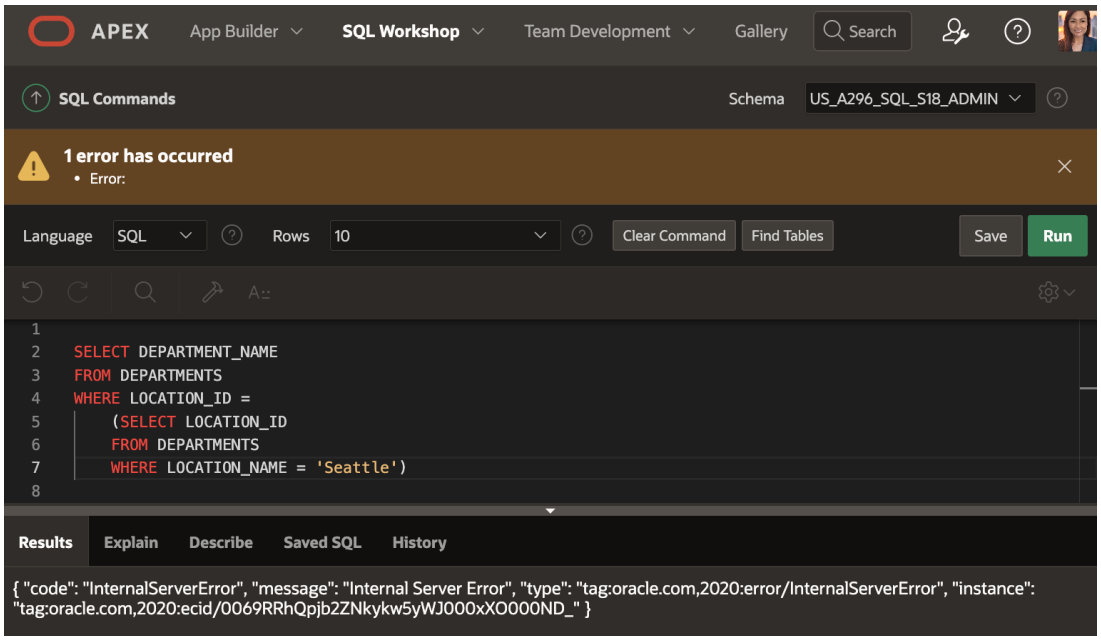
8. What are the names of the Global Fast Foods staff members whose staff types are not the same as Bob Miller's?



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.

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

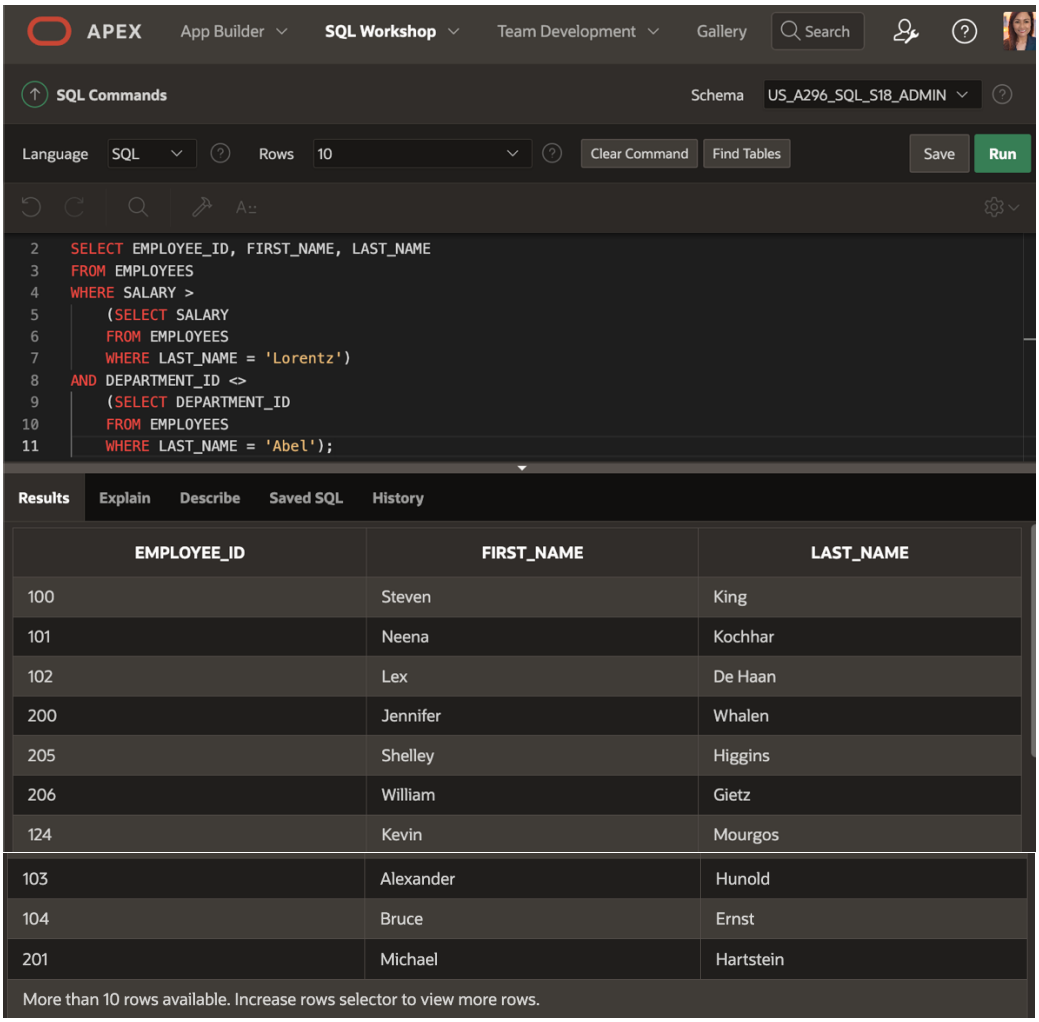
TRUE b. A subquery can reference a table that is not included in the outer query's FROM clause.

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

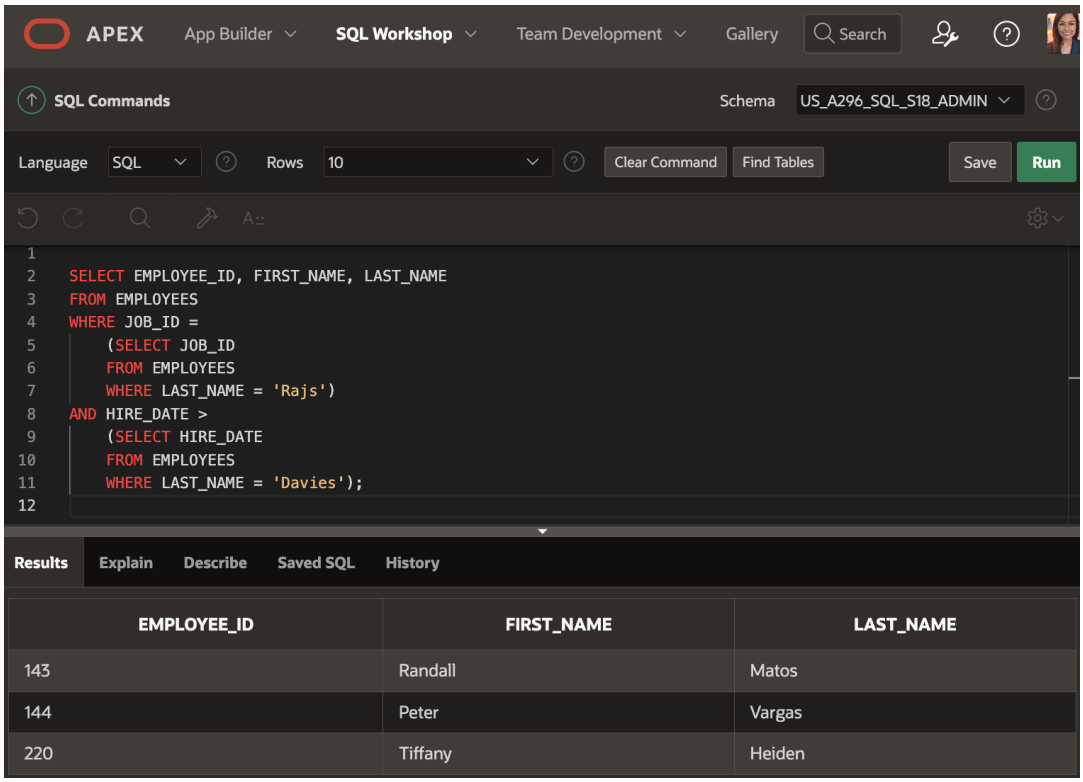
SQL Database Programming: Section 10-2: Single-Row Subqueries

Try It/ Solve It

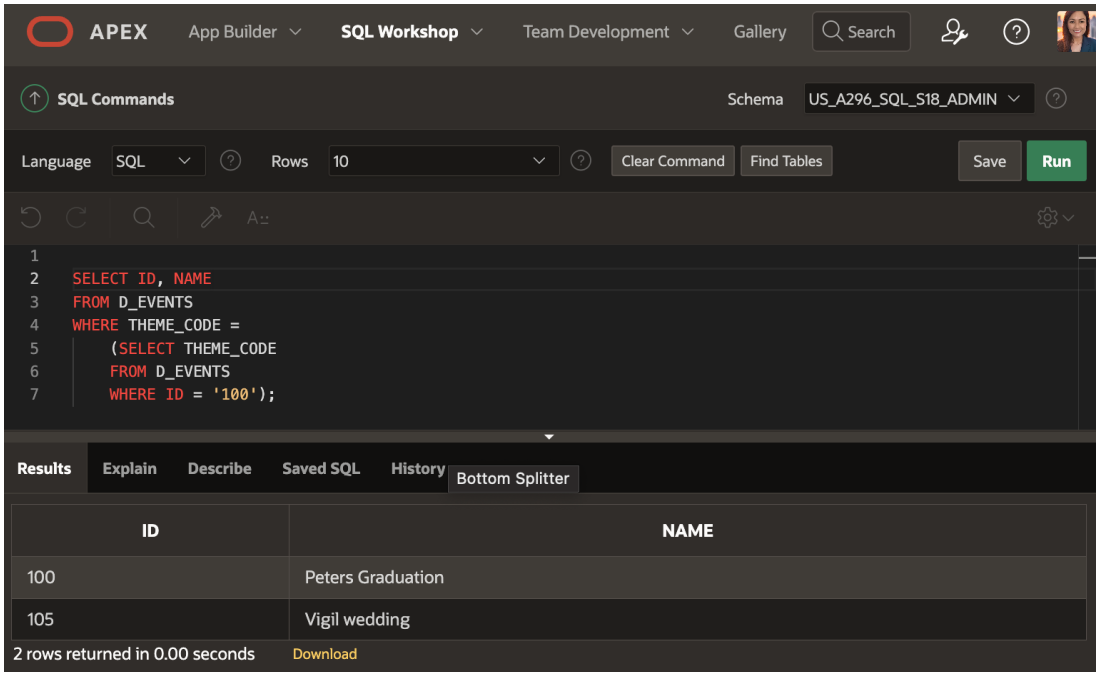
1. Write a query to return all those employees who have a salary greater than that of Lorentz and aren't in the same department as Abel.



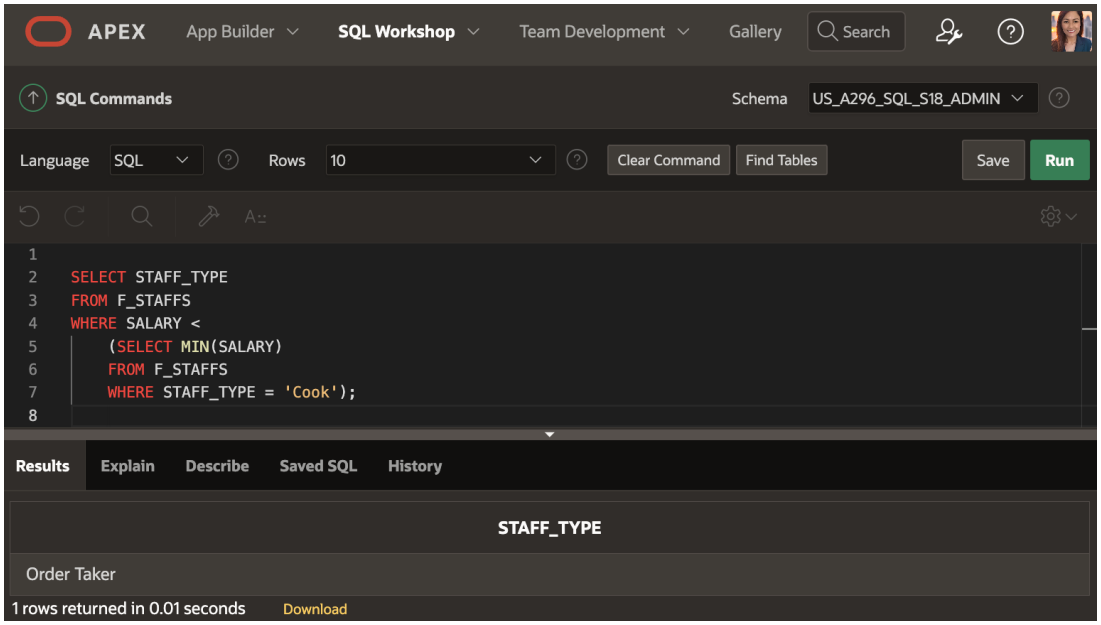
2. Write a query to return all those employees who have the same job id as Rajs and were hired after Davies.



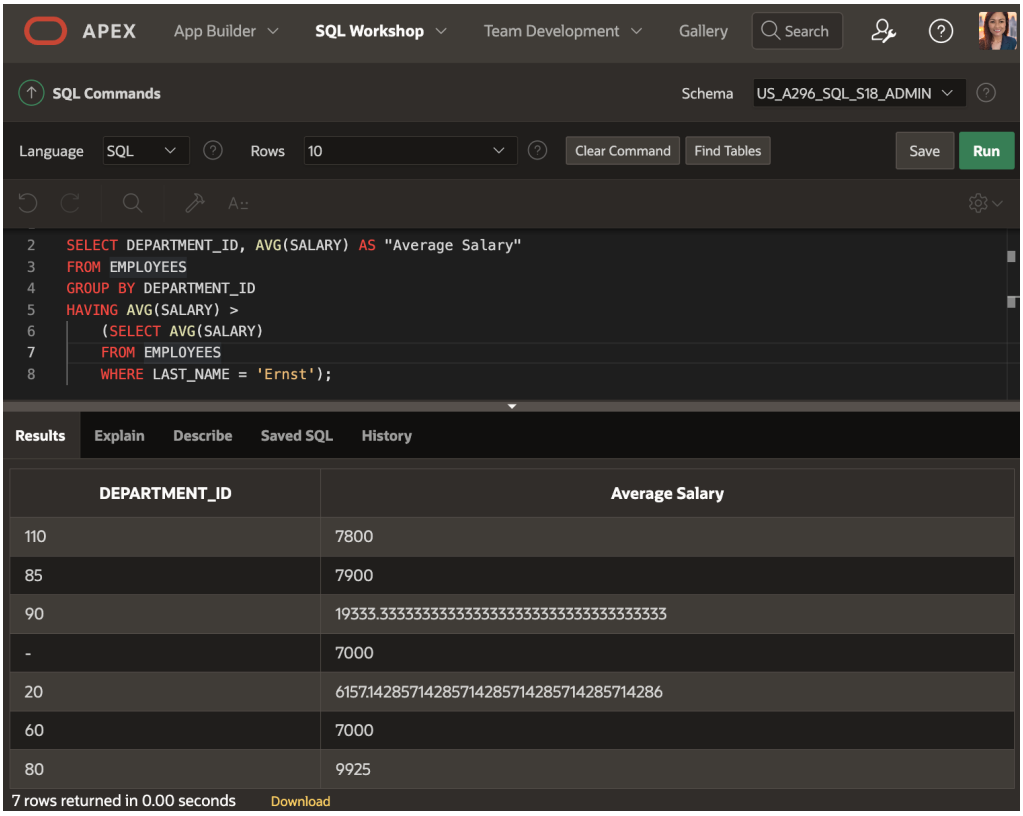
3. What DJs on Demand events have the same theme code as event ID = 100?



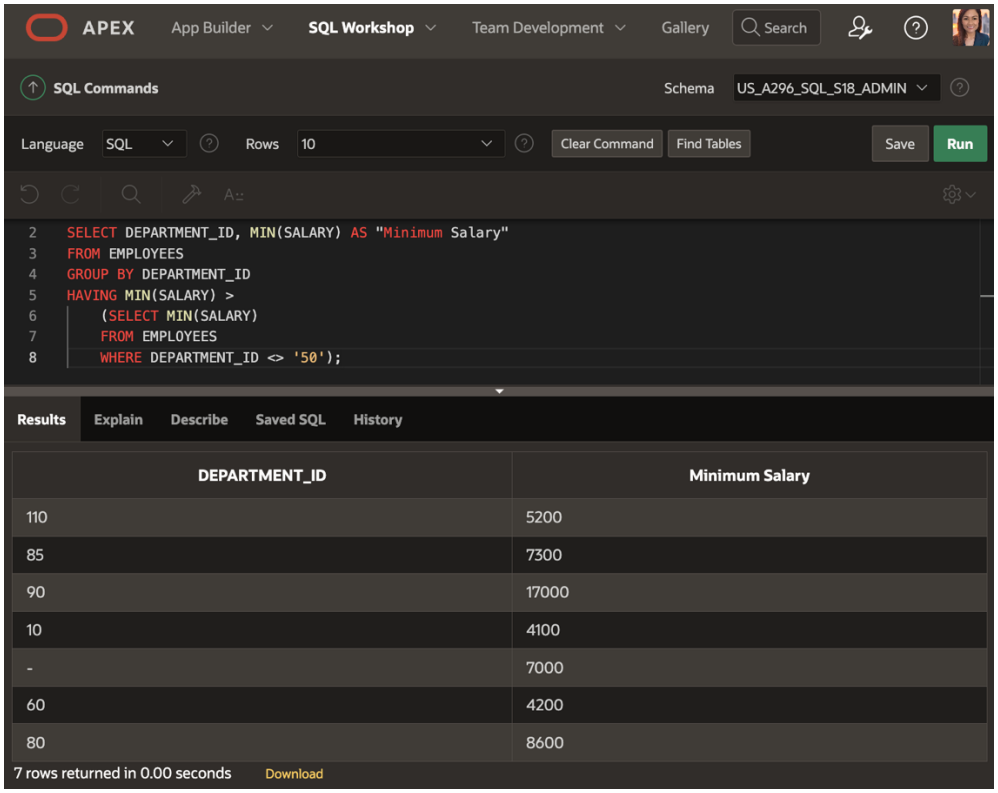
4. What is the staff type for those Global Fast Foods jobs that have a salary less than those of any Cook staff-type jobs?



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.



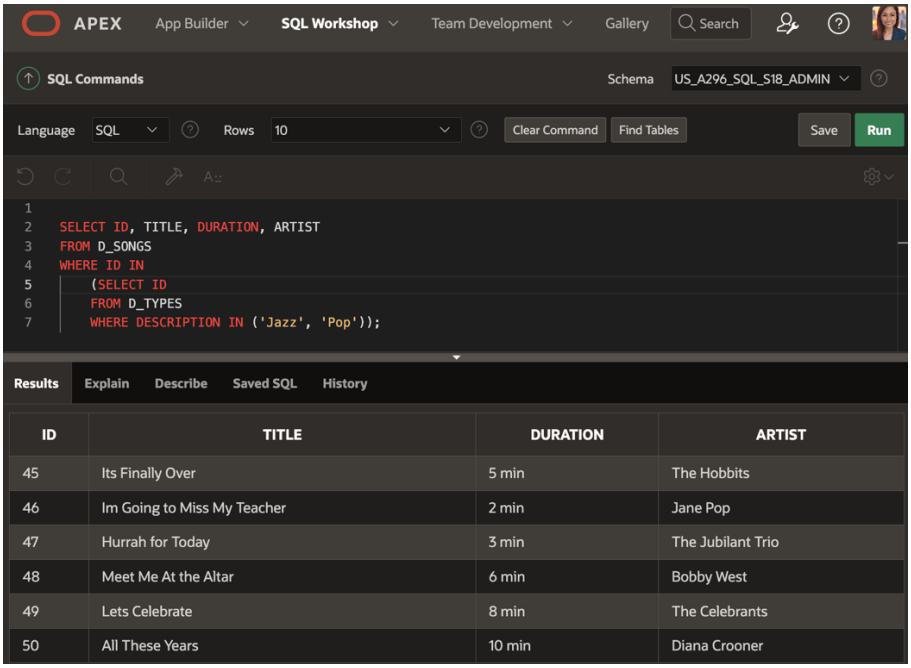
SQL Database Programming: Section 10-3: Multiple-Row Subqueries

Try It/ Solve It

1. What will be returned by a query if it has a subquery that returns a null ?
   - "If a subquery returns a null value or no rows, the outer query takes the results of the subquery (null) and uses this result in its WHERE clause." (Oracle, 2020)

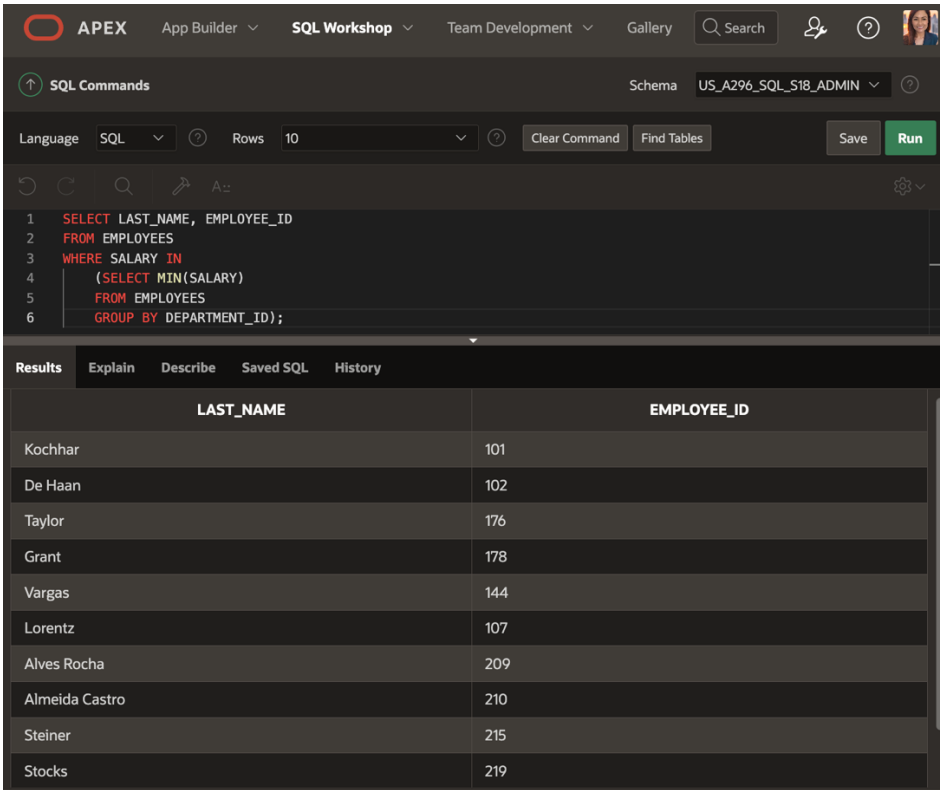
<<< MORE ANSWERS CONTINUE ON THE NEXT PAGE >>>

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.



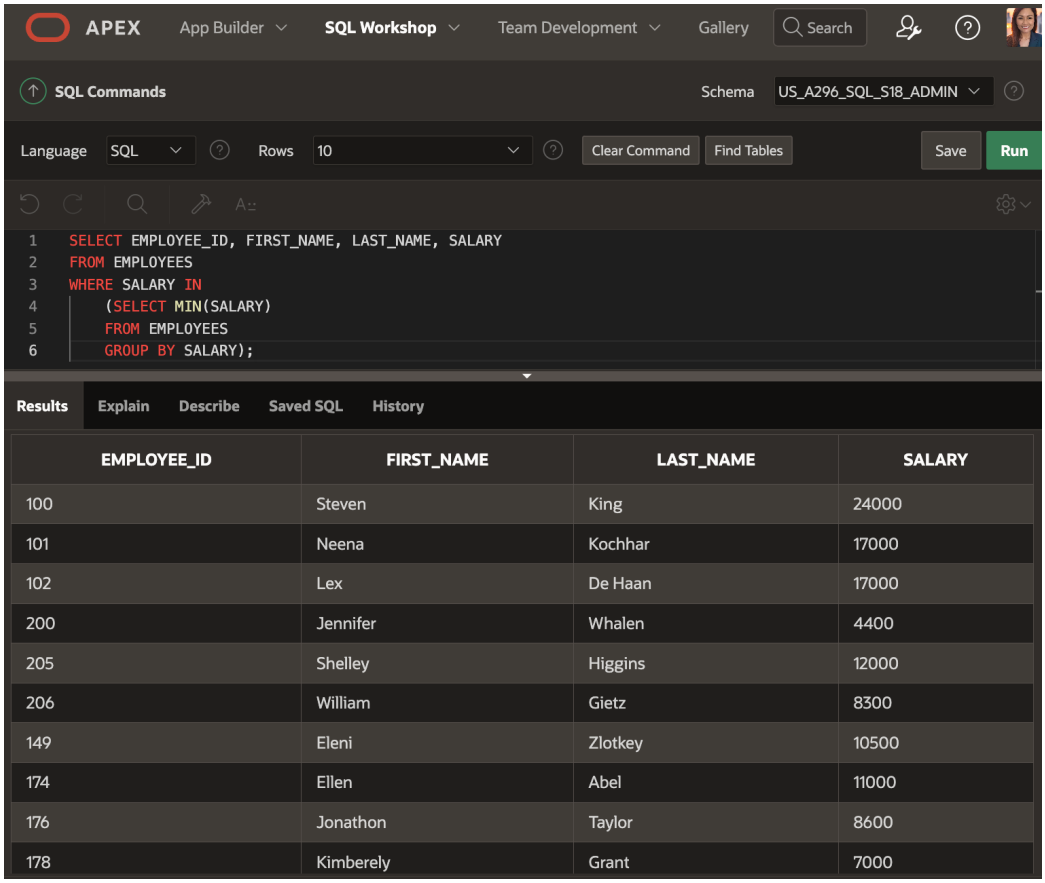
ID	TITLE	DURATION	ARTIST
45	Its Finally Over	5 min	The Hobbits
46	Im Going to Miss My Teacher	2 min	Jane Pop
47	Hurrah for Today	3 min	The Jubilant Trio
48	Meet Me At the Altar	6 min	Bobby West
49	Lets Celebrate	8 min	The Celebrants
50	All These Years	10 min	Diana Crooner

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



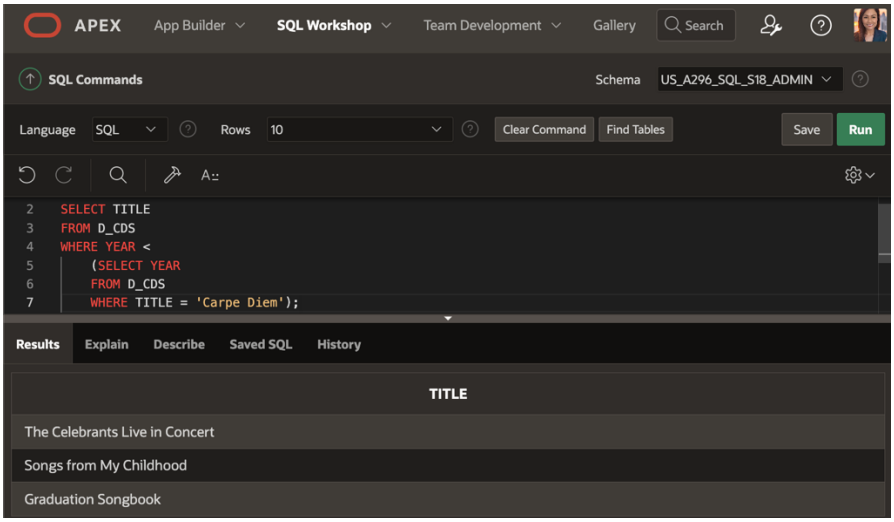
LAST_NAME	EMPLOYEE_ID
Kochhar	101
De Haan	102
Taylor	176
Grant	178
Vargas	144
Lorentz	107
Alves Rocha	209
Almeida Castro	210
Steiner	215
Stocks	219

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



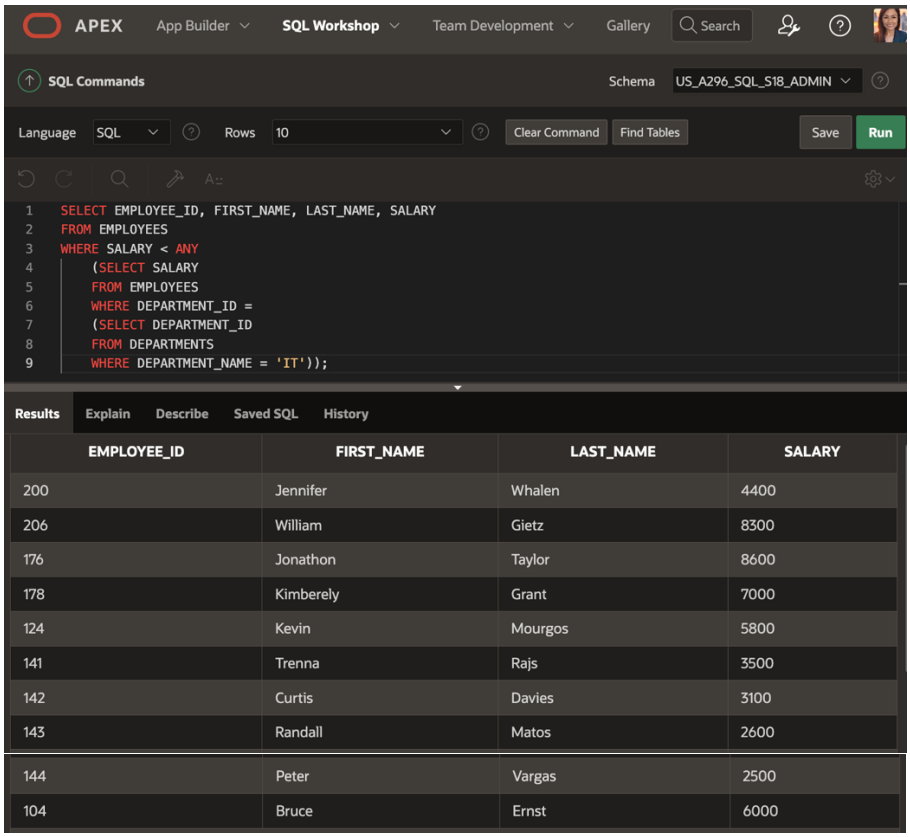
EMPLOYEE_ID	FIRST_NAME	LAST_NAME	SALARY
100	Steven	King	24000
101	Neena	Kochhar	17000
102	Lex	De Haan	17000
200	Jennifer	Whalen	4400
205	Shelley	Higgins	12000
206	William	Gietz	8300
149	Eleni	Zlotkey	10500
174	Ellen	Abel	11000
176	Jonathon	Taylor	8600
178	Kimberely	Grant	7000

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 FROM d_cds WHERE title = 'Carpe Diem');

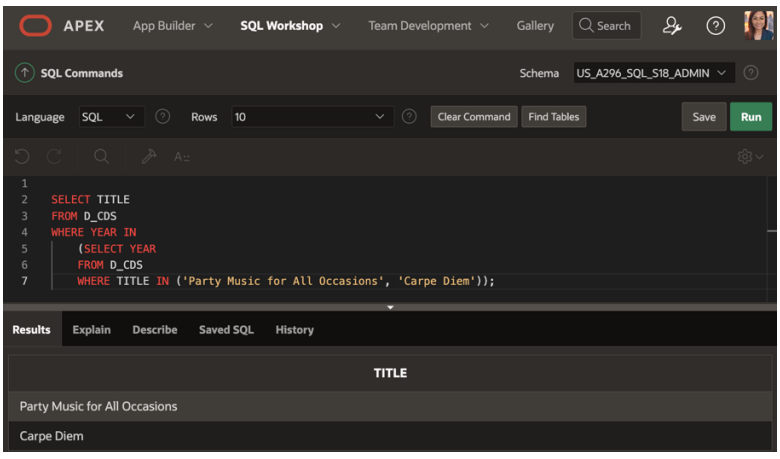


TITLE
The Celebrants Live in Concert
Songs from My Childhood
Graduation Songbook

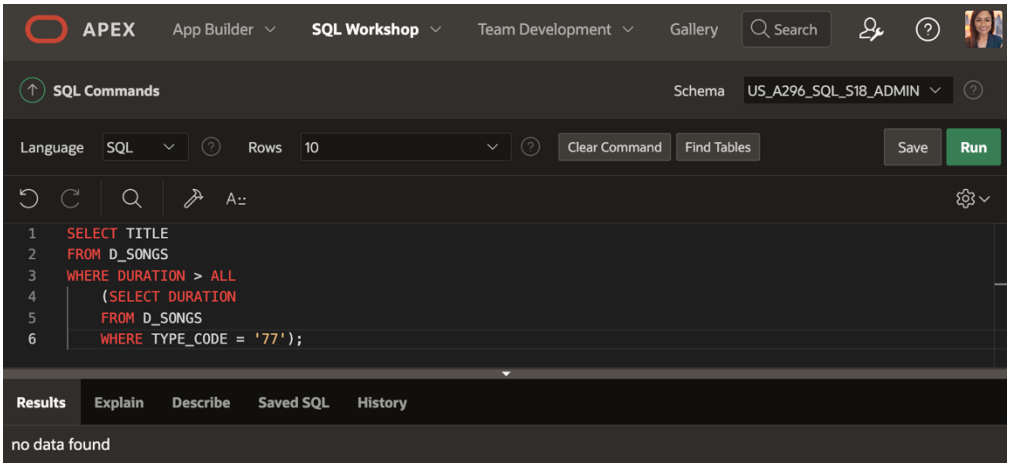
b. Which employees have salaries lower than any one of the programmers in the IT department?
WHERE salary < any (SELECT salary FROM employees WHERE department_id = (SELECT department_id FROM departments WHERE department_name = 'IT'));



c. What CD titles were produced in the same year as "Party Music for All Occasions" or "Carpe Diem"?
WHERE year IN (SELECT year IN (SELECT year FROM d_cds WHERE title IN ('Party Music for All Occasions', 'Carpe Diem'));



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?

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.

TRUE 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;
```

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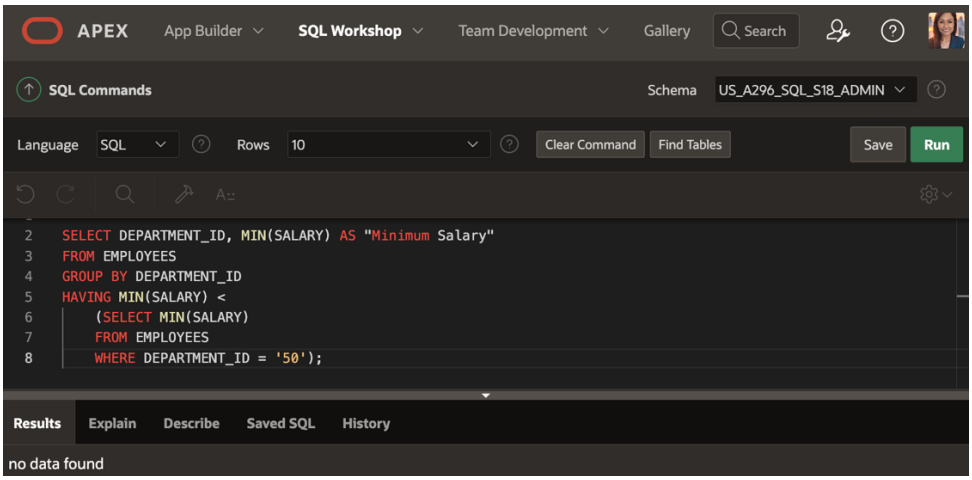


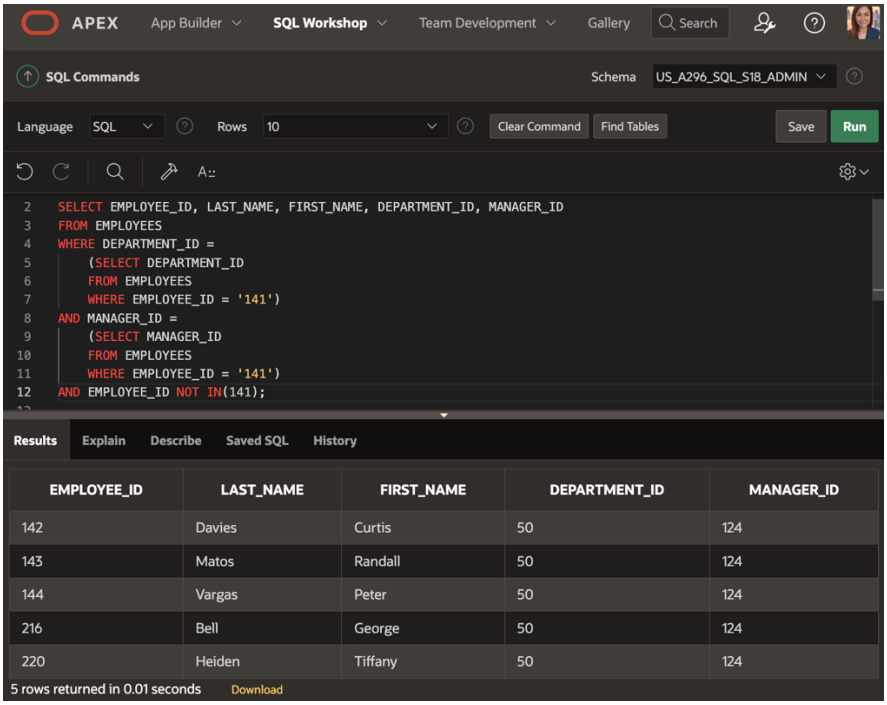
8. Which statements are **true** about the subquery below?

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

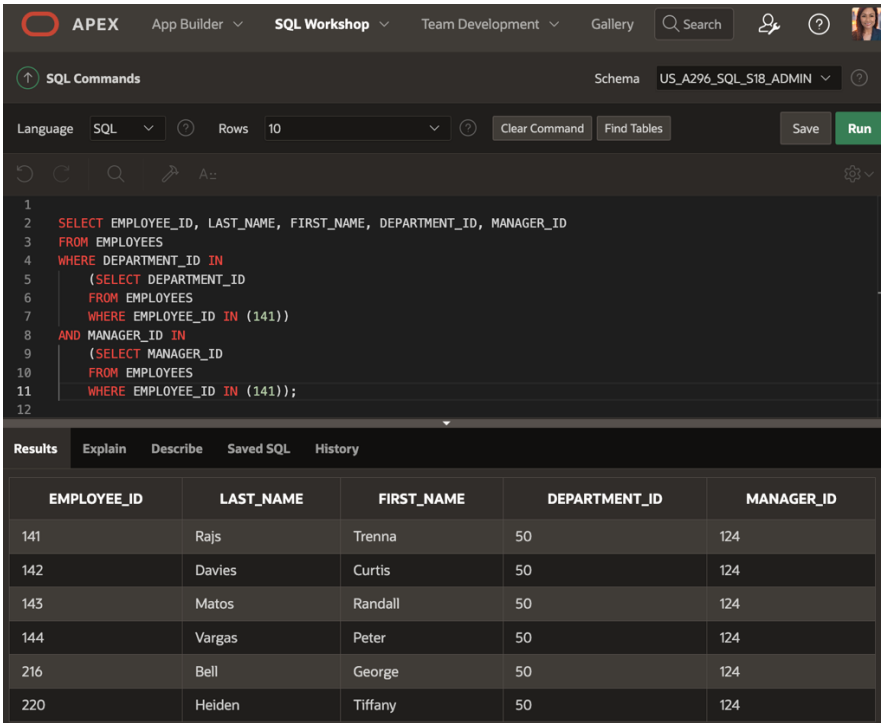
_____ a. The inner query could be eliminated simply by changing the WHERE clause to WHERE MIN(salary).
__TRUE__ b. The query wants the names of employees who make the same salary as the smallest salary in any department.
_____ c. The query first selects the employee ID and last name, and then compares that to the salaries in every department.
_____ d. This query will not execute.

<<< MORE ANSWERS CONTINUE ON THE NEXT PAGE >>>

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**.



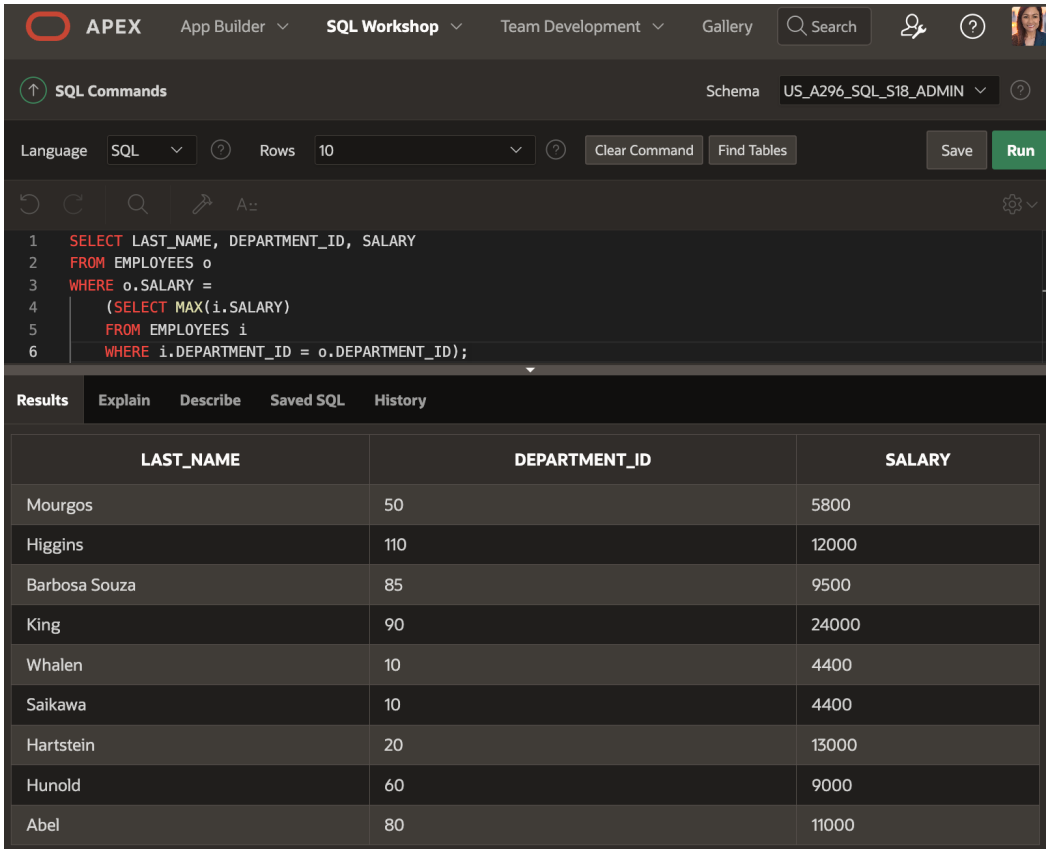
SQL Database Programming: Section 10-4: Correlated Subqueries

Try It/ Solve It

1. Explain the main difference between correlated and non-correlated subqueries?
   - Correlated Subquery:
     - Each subquery is executed once for every row being processed by outer query.
     - It depends on the outer query for its values. It refers to a column from the outer query within the WHERE clause.

   - Non-Correlated Subquery:
     - Each subquery is only executed once/independently of the outer query.
     - Each result from the subquery is passed to the outer query which will be used in WHERE/HAVING/FROM clause.

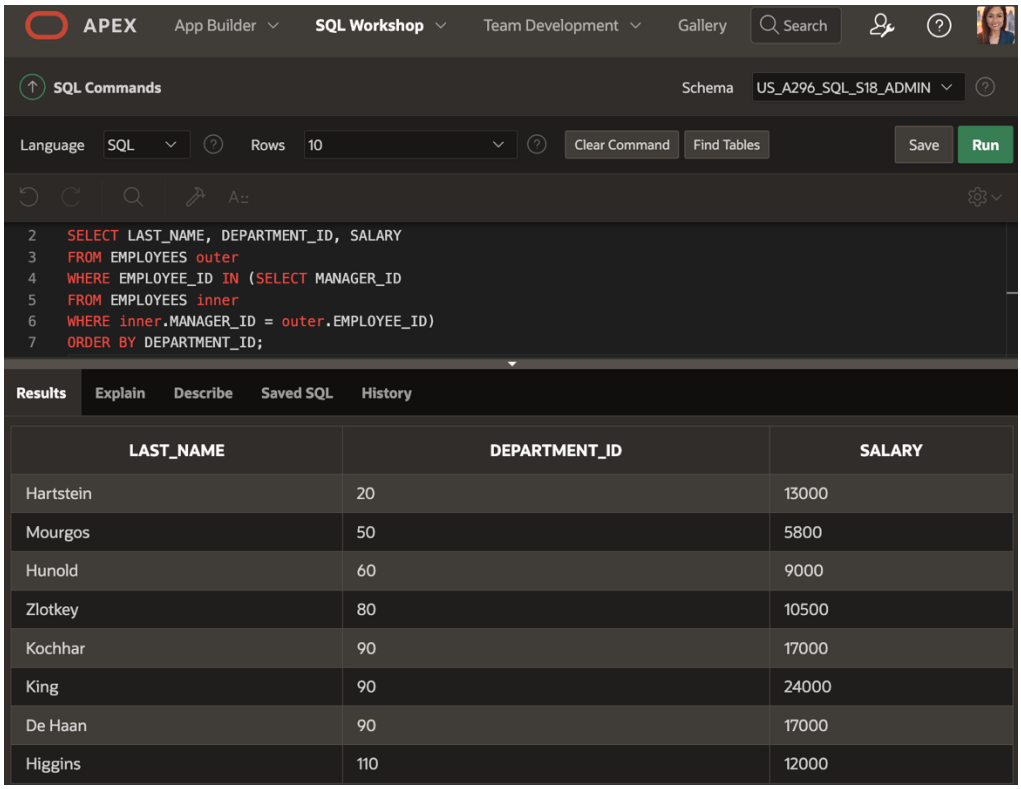
2. Write a query that **lists the highest earners for each department**. Include the last_name, department_id, and the salary for each employee.



LAST_NAME	DEPARTMENT_ID	SALARY
Mourgos	50	5800
Higgins	110	12000
Barbosa Souza	85	9500
King	90	24000
Whalen	10	4400
Saikawa	10	4400
Hartstein	20	13000
Hunold	60	9000
Abel	80	11000

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. Finish off the statement by sorting the rows on the department_id column.

```
SELECT LAST_NAME, DEPARTMENT_ID, SALARY
FROM EMPLOYEES outer
WHERE EMPLOYEE_ID IN (SELECT MANAGER_ID
FROM EMPLOYEES inner
WHERE inner.MANAGER_ID = outer.EMPLOYEE_ID)
ORDER BY DEPARTMENT_ID;
```



LAST_NAME	DEPARTMENT_ID	SALARY
Hartstein	20	13000
Mourgos	50	5800
Hunold	60	9000
Zlotkey	80	10500
Kochhar	90	17000
King	90	24000
De Haan	90	17000
Higgins	110	12000

<<< MORE ANSWERS CONTINUE ON THE NEXT PAGE >>>

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.