

## Section 6 Lesson 1: Fundamentals of Subqueries

### 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.
2. What is a subquery? A subquery is a SELECT statement that is embedded in 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? Song IDs 46 and 47 have the same event ID as song ID 45.
4. Which events in the DJs on Demand database cost more than event\_id = 100? Vigil Wedding ID no. 105 costs more.
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." Tropical-themed events: ID no. 100 (Peters Graduation) and no. 105 (Vigil wedding).

7. What are the names of the Global Fast Foods staff members whose salaries are greater than the staff member whose ID is 12? **Monique Tuttle is the staff member whose salary is 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? **Sue Doe and Monique Tuttle are the staff whose types are not the same as Bob Miller's.**
9. Which Oracle employees have the same department ID as the IT department? **Alexander Hunoid, Bruce Ernst, and Diana Lorentz are the employees who 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? **Administration, Executive, Accounting, and Contracting departments all have the same location ID as 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. **TRUE** A subquery can reference a table that is not included in the outer query's FROM clause.
  - c. **FALSE** Single-row subqueries can return multiple values to the outer query.

12. 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.

The screenshot shows the Oracle SQL Workshop interface. The top navigation bar includes 'Home', 'Application Builder', 'SQL Workshop', and 'Administration'. The 'SQL Workshop' tab is active, and the 'SQL Commands' sub-tab is selected. The schema is 'US\_1350\_SQL'. The SQL editor contains the following query:

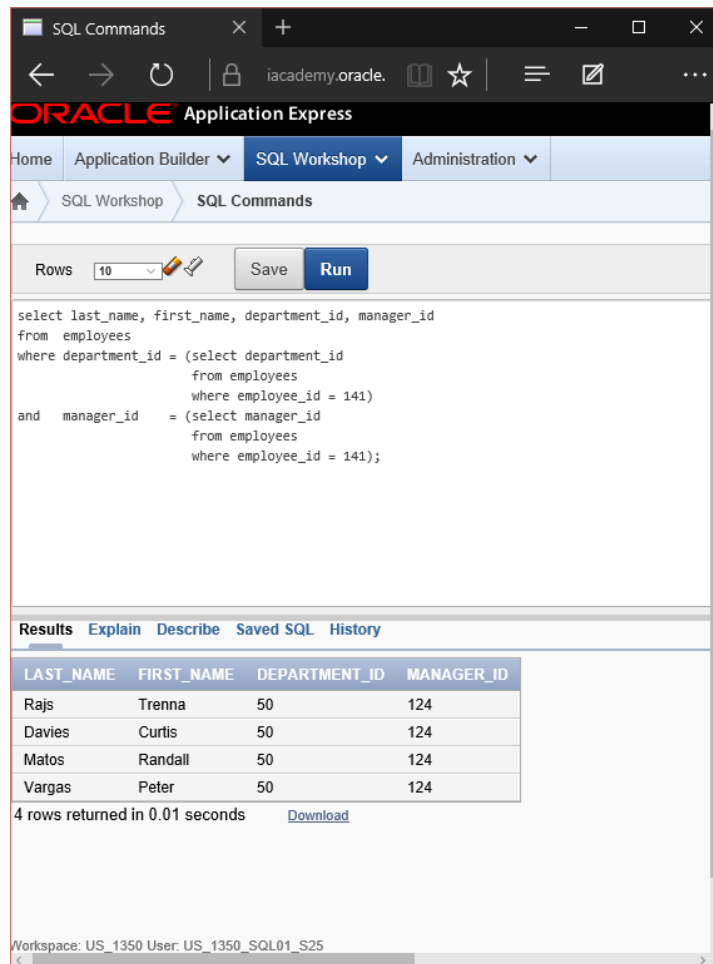
```
select last_name, first_name, department_id, manager_id
from employees
where (department_id, manager_id) = (
select department_id, manager_id
from employees
where employee_id = 141)
and employee_id != 141;
```

The 'Run' button is highlighted. Below the editor, the 'Results' tab is active, showing a table with 3 rows:

LAST_NAME	FIRST_NAME	DEPARTMENT_ID	MANAGER_ID
Davies	Curtis	50	124
Matos	Randall	50	124
Vargas	Peter	50	124

Below the table, it states '3 rows returned in 0.01 seconds' with a 'Download' link. The bottom status bar shows 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25' and a 'Language' dropdown.

13. 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.



The screenshot shows the Oracle Application Express SQL Workshop interface. The top navigation bar includes 'Home', 'Application Builder', 'SQL Workshop', and 'Administration'. The 'SQL Workshop' tab is active, and the 'SQL Commands' page is displayed. The 'Rows' dropdown is set to 10. The 'Run' button is highlighted. The SQL command entered is:

```
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);
```

The 'Results' tab is selected, showing a table with 4 rows and 4 columns: LAST\_NAME, FIRST\_NAME, DEPARTMENT\_ID, and MANAGER\_ID. The results are:

LAST_NAME	FIRST_NAME	DEPARTMENT_ID	MANAGER_ID
Rajs	Trenna	50	124
Davies	Curtis	50	124
Matos	Randall	50	124
Vargas	Peter	50	124

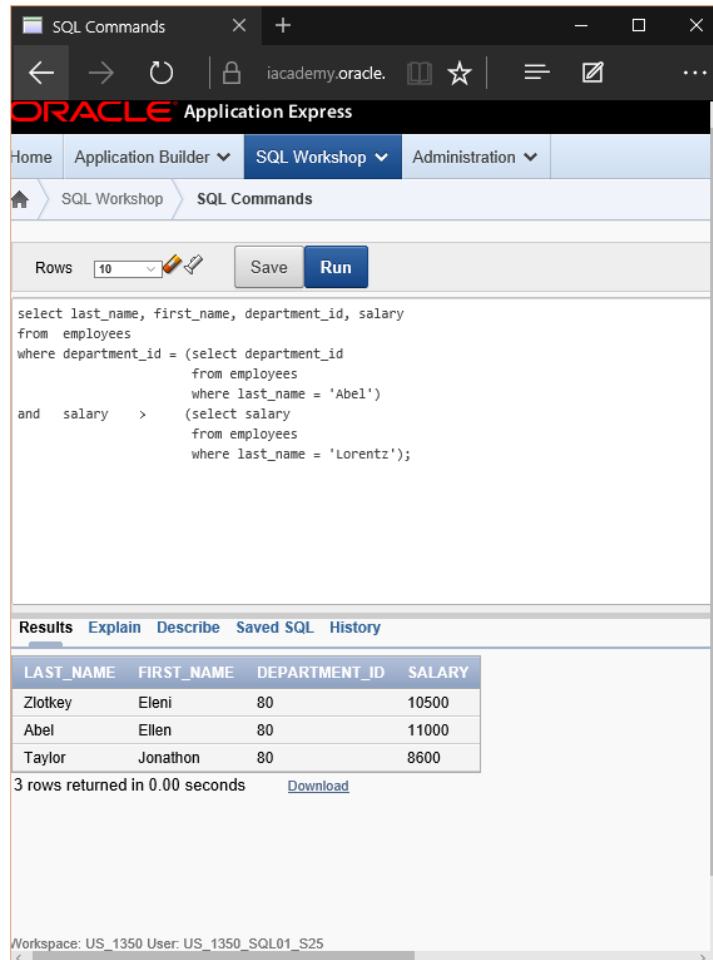
Below the table, it states '4 rows returned in 0.01 seconds' with a 'Download' link. The bottom status bar shows 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25'.



## Section 6 Lesson 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 are in the same department as Abel.



The screenshot shows the Oracle SQL Workshop interface. The top navigation bar includes 'Home', 'Application Builder', 'SQL Workshop', and 'Administration'. The 'SQL Workshop' tab is active, and the 'SQL Commands' sub-tab is selected. Below the navigation bar, there is a 'Rows' dropdown set to '10', a 'Save' button, and a 'Run' button. The SQL command area contains the following query:

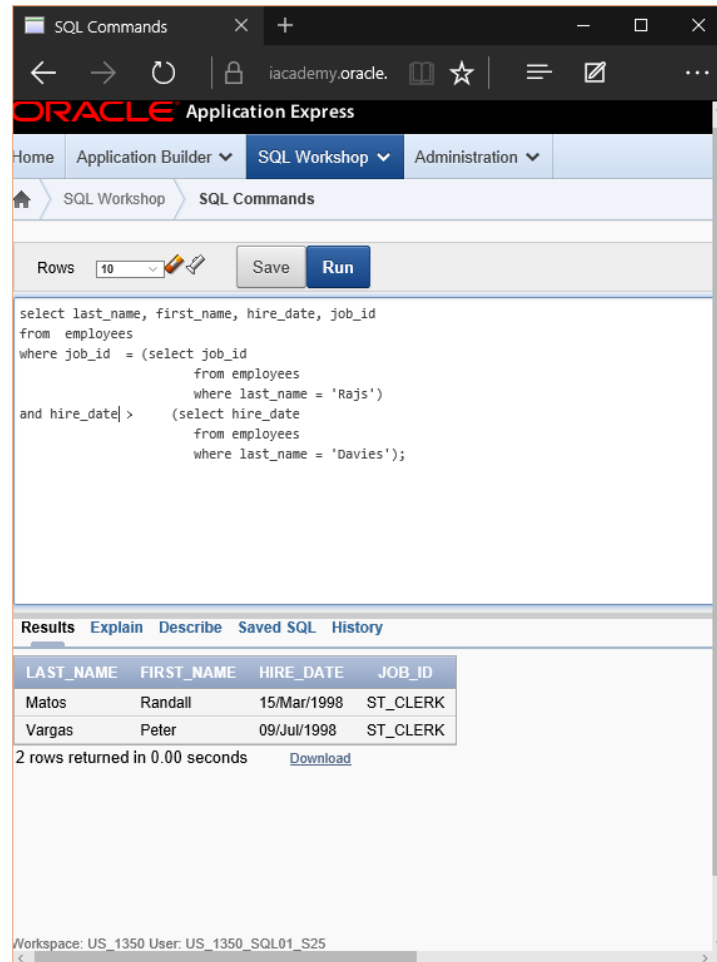
```
select last_name, first_name, department_id, salary
from employees
where department_id = (select department_id
                      from employees
                      where last_name = 'Abel')
and salary > (select salary
             from employees
             where last_name = 'Lorentz');
```

Below the query, the 'Results' tab is active, displaying a table with 3 rows and 4 columns: LAST\_NAME, FIRST\_NAME, DEPARTMENT\_ID, and SALARY.

LAST_NAME	FIRST_NAME	DEPARTMENT_ID	SALARY
Zlotkey	Eleni	80	10500
Abel	Ellen	80	11000
Taylor	Jonathon	80	8600

Below the table, it states '3 rows returned in 0.00 seconds' with a 'Download' link. The bottom status bar shows 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25'.

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



The screenshot shows the Oracle SQL Workshop interface. The top navigation bar includes 'Home', 'Application Builder', 'SQL Workshop', and 'Administration'. The 'SQL Workshop' tab is active, and the 'SQL Commands' sub-tab is selected. Below the navigation bar, there is a 'Rows' dropdown set to '10', a 'Save' button, and a 'Run' button. The SQL command area contains the following query:

```
select last_name, first_name, hire_date, job_id
from employees
where job_id = (select job_id
                from employees
                where last_name = 'Rajs')
and hire_date > (select hire_date
                 from employees
                 where last_name = 'Davies');
```

Below the query, the 'Results' tab is active, displaying a table with the following data:

LAST_NAME	FIRST_NAME	HIRE_DATE	JOB_ID
Matos	Randall	15/Mar/1998	ST_CLERK
Vargas	Peter	09/Jul/1998	ST_CLERK

Below the table, it states '2 rows returned in 0.00 seconds' with a 'Download' link. The bottom status bar shows 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25'.

3. What DJs on Demand events have the same theme code as event ID = 100? [Event ID 105 \(Vigil wedding\)](#) has 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? [There are no staff\\_types listed 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.



The screenshot shows the Oracle SQL Workshop interface. The top navigation bar includes 'Home', 'Application Builder', 'SQL Workshop', and 'Administration'. The 'SQL Workshop' tab is active, and the 'SQL Commands' sub-tab is selected. Below the navigation bar, there is a 'Rows' dropdown set to 10, and 'Save' and 'Run' buttons. The SQL command area contains the following query:

```
select department_id, avg(salary) AVG_SALARY
from departments
natural join employees
having avg(salary) > (select salary
                     from employees
                     where last_name = 'Ernst')
group by department_id;
```

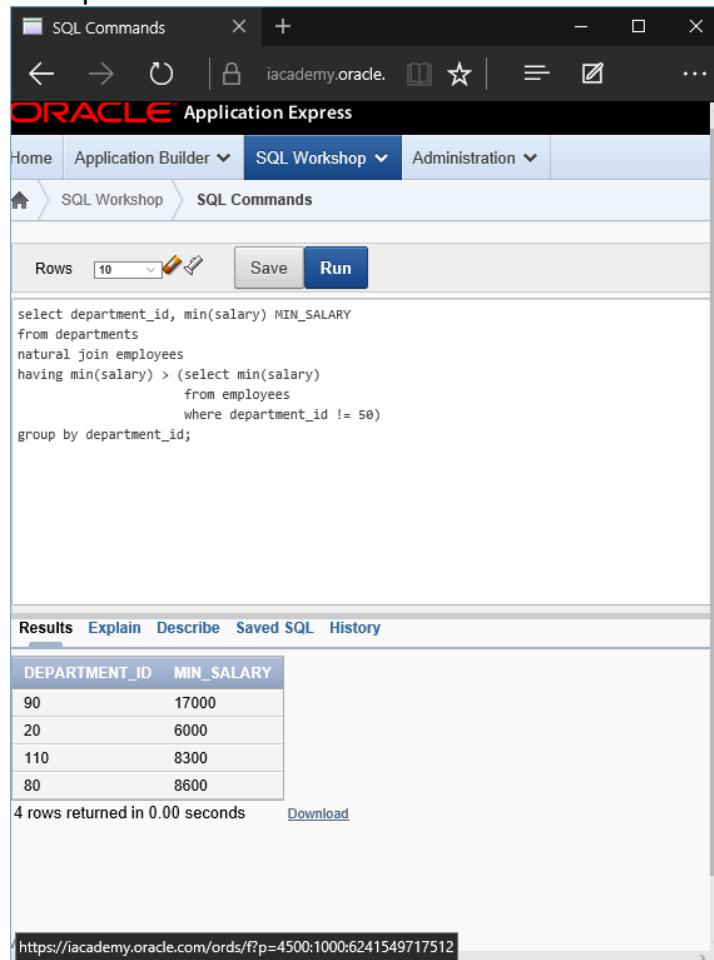
Below the query, the 'Results' tab is active, displaying a table with the following data:

DEPARTMENT_ID	AVG_SALARY
90	17000
110	8300
80	9800

Below the table, it states '3 rows returned in 0.01 seconds' and provides a 'Download' link. The bottom status bar shows 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25'.



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.



The screenshot shows the Oracle Application Express SQL Workshop interface. The top navigation bar includes 'Home', 'Application Builder', 'SQL Workshop', and 'Administration'. The 'SQL Workshop' tab is active, and the 'SQL Commands' sub-tab is selected. Below the navigation bar, there is a 'Rows' dropdown set to '10', a 'Save' button, and a 'Run' button. The SQL command area contains the following query:

```
select department_id, min(salary) MIN_SALARY
from departments
natural join employees
having min(salary) > (select min(salary)
                     from employees
                     where department_id != 50)
group by department_id;
```

Below the SQL command area, the 'Results' tab is active, displaying the query results in a table:

DEPARTMENT_ID	MIN_SALARY
90	17000
20	6000
110	8300
80	8600

Below the table, it states '4 rows returned in 0.00 seconds' and provides a 'Download' link. The bottom of the interface shows the URL: <https://iacademy.oracle.com/ords/f?p=4500:1000:6241549717512>.

7.

## Section 6 Lesson 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 ? **'No datafound.'** is returned by a query if it has a subquery returning a null value.
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.



The screenshot shows the Oracle SQL Workshop interface. The SQL Commands window contains the following query:

```
select id, title, duration, artist
from d_songs
where type_code in (
select code
from d_types
where description in
('Jazz', 'Pop'));
```

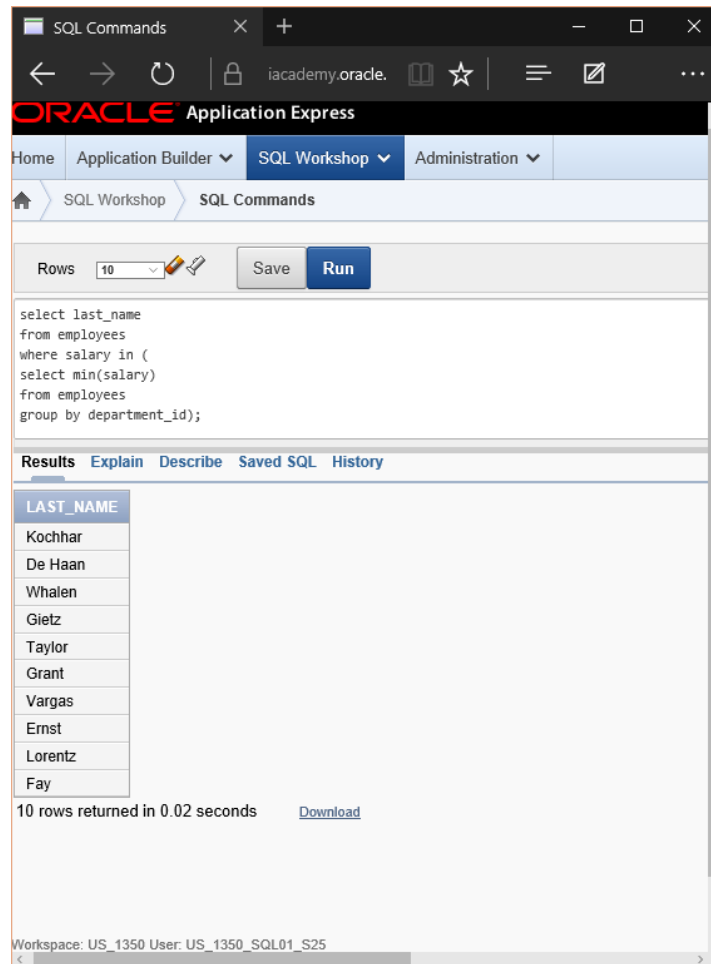
The Results tab shows the following data:

ID	TITLE	DURATION	ARTIST
48	Meet Me At the Altar	6 min	Bobby West
46	Im Going to Miss My Teacher	2 min	Jane Pop
53	victory victory	5min	
52	surfing summer		
45	Its Finally Over	5 min	The Hobbits

5 rows returned in 0.01 seconds [Download](#)

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

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

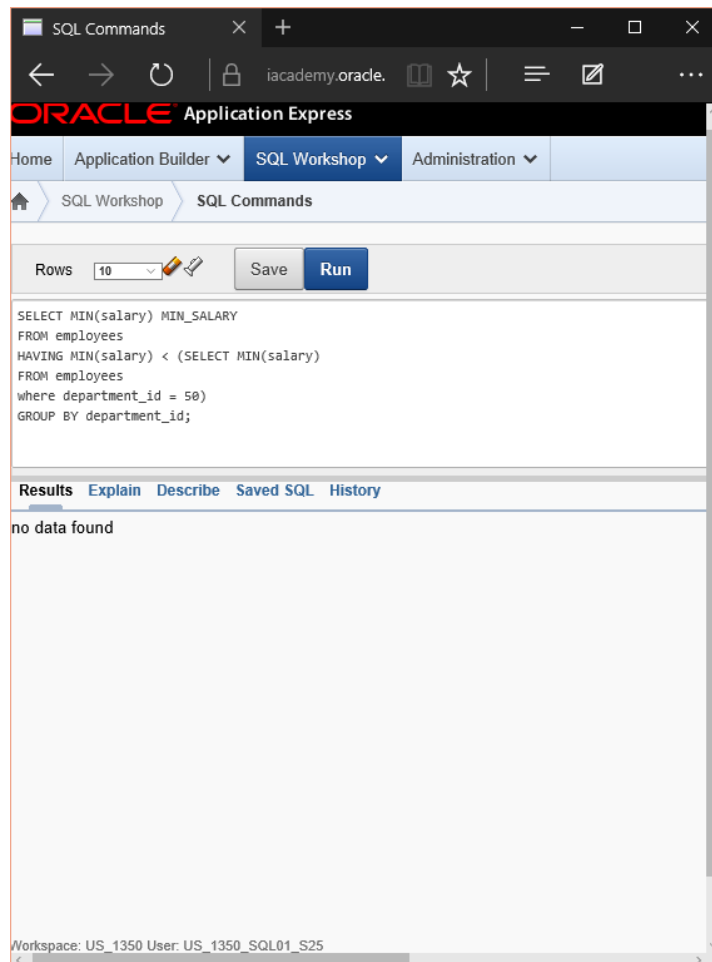


4. Which Global Fast Foods employee earns the lowest salary? Hint: You can use either a single-row or a multiple-row subquery. **Sue Doe and Bob Miller both earn the lowest salary at 10.**
5. Place the correct multiple-row comparison operators in the outer query WHERE clause of each of the following:
  - 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’) (SELECT year ...
  - b. Which employees have salaries lower than any one of the programmers in the IT department?  
 WHERE salary = (SELECT min(salary) FROM employees NATURAL JOIN departments WHERE department\_name = 'IT') (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 FROM d\_cds WHERE title IN ('Party Music for All Occasions', 'Carpe Diem')) (SELECT year ...

d. What song title has a duration longer than every type code 77 title? WHERE duration > ANY (SELECT duration FROM d\_songs WHERE type\_code = 77) (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.
  - 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-DEC2002, 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).
- 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.
- TRUE d. This query will not execute.

## Section 6 Lesson 4: Correlated Subqueries

### Try It / Solve It

1. Explain the main difference between correlated and non-correlated subqueries?  
*Correlated subqueries are used for row-by-row processing and are each executed once for every row of the outer query. With a normal subquery, the inner SELECT query runs and executes once, returning a set of values to 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.

The screenshot shows the Oracle SQL Workshop interface. The top navigation bar includes 'Home', 'Application Builder', 'SQL Workshop', and 'Administration'. The 'SQL Workshop' tab is active, and the 'SQL Commands' sub-tab is selected. Below the navigation bar, there is a 'Rows' dropdown set to '10', and 'Save' and 'Run' buttons. The SQL command area contains the following query:

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

Below the query, the 'Results' tab is active, displaying a table with the following data:

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

Below the table, it states '7 rows returned in 0.02 seconds' with a 'Download' link. The bottom status bar shows 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25'.

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.

The screenshot shows the Oracle SQL Workshop interface. The SQL Commands window contains the following query:

```
SELECT outer.last_name, outer.department_id, outer.salary
FROM employees outer
WHERE outer.manager_id IN (SELECT inner.employee_id
                           FROM employees inner
                           WHERE inner.employee_id = outer.manager_id)
ORDER BY outer.department_id;
```

The Results tab shows the following data:

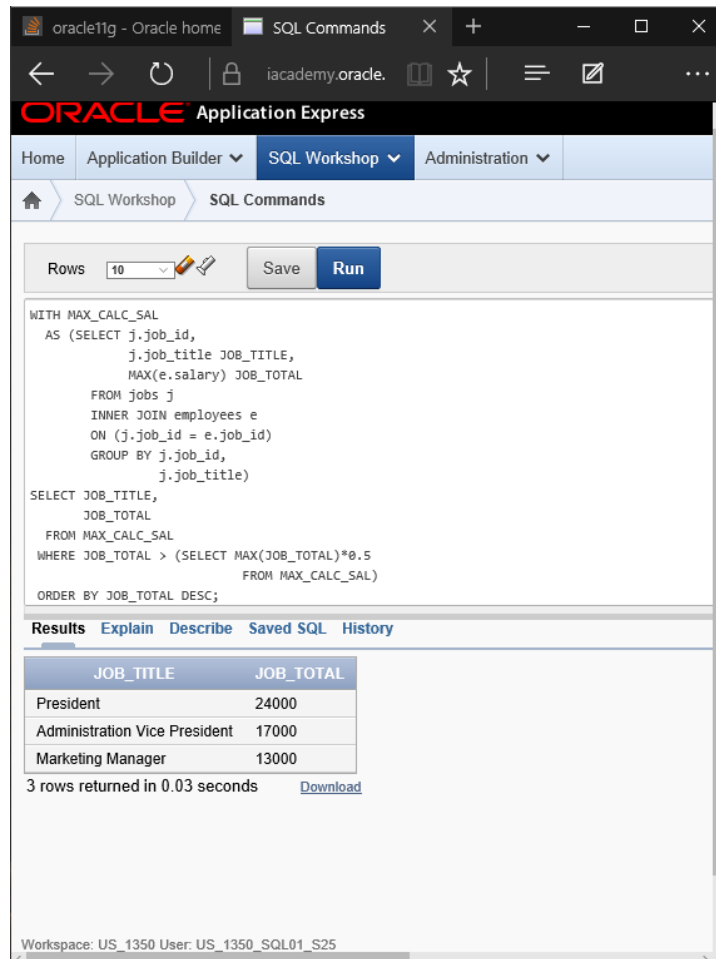
LAST_NAME	DEPARTMENT_ID	SALARY
Whalen	10	4400
Hartstein	20	13000
Fay	20	6000
Mourgos	50	5800
Vargas	50	2500
Matos	50	2600
Davies	50	3100
Rajs	50	3500
Hunold	60	9000
Ernst	60	6000

More than 10 rows available. Increase rows selector to view more rows.  
10 rows returned in 0.00 seconds [Download](#)

Workspace: US\_1350 User: US\_1350\_SQL01\_S25

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.



The screenshot shows the Oracle Application Express interface. The top navigation bar includes 'Home', 'Application Builder', 'SQL Workshop', and 'Administration'. The 'SQL Workshop' tab is active, and the 'SQL Commands' sub-tab is selected. Below the navigation bar, there is a 'Rows' dropdown set to '10', and 'Save' and 'Run' buttons. The SQL editor contains the following query:

```
WITH MAX_CALC_SAL
AS (SELECT j.job_id,
      j.job_title JOB_TITLE,
      MAX(e.salary) JOB_TOTAL
   FROM jobs j
   INNER JOIN employees e
   ON (j.job_id = e.job_id)
   GROUP BY j.job_id,
      j.job_title)
SELECT JOB_TITLE,
      JOB_TOTAL
   FROM MAX_CALC_SAL
  WHERE JOB_TOTAL > (SELECT MAX(JOB_TOTAL)*0.5
                    FROM MAX_CALC_SAL)
 ORDER BY JOB_TOTAL DESC;
```

Below the query, the 'Results' tab is active, displaying a table with 3 rows:

JOB_TITLE	JOB_TOTAL
President	24000
Administration Vice President	17000
Marketing Manager	13000

Below the table, it states '3 rows returned in 0.03 seconds' and provides a 'Download' link. The bottom status bar shows 'Workspace: US\_1350 User: US\_1350\_SQL01\_S25'.