Practice 10
10-1

Outer query	It accepts a value from the inner query to complete its SELECT statement
subquery	An inner query that returns one or more rows to the outer query
Inner query	An inner query that is nested within an outer query
Pair-wise multiple column subquery	An inner query that compares multiple columns at the same time
Multiple row subquery	An inner that returns only one row to the outer query
Non-pair-wise multiple-column subquery	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?

   extracting right part in WHERE/HAVING/FROM clause

2. What is a subquery?

   An inner query that is nested within an outer query

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

```
SELECT song_id
FROM d_play_list_items
WHERE event_id IN(SELECT event_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?

```
SELECT id, name
FROM d_events
WHERE cost > (SELECT cost 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.”

```
SELECT track
FROM d_track_listings
WHERE cd_number = (SELECT cd_number FROM d_cds WHERE title = 'Party Music for All
Occasions');
```

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

```
SELECT id, name
FROM d_events
WHERE theme_code = (SELECT code FROM d_themes WHERE description = '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?

```
SELECT first_name,last_name
FROM f_staffs
WHERE salary > (SELECT salary FROM f_staffs WHERE id = 12);
```

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

```
SELECT first_name,last_name
FROM f_staffs
WHERE staff_type != (SELECT staff_type FROM f_staffs WHERE first_name = 'Bob' AND
last_name ='Miller');
```

9. Which Oracle employees have the same department ID as the IT department?

```
SELECT first_name,last_name
FROM employees
WHERE department_id = (SELECT department_id FROM departments WHERE
department_name = 'IT');
```

10. What are the department names of the Oracle departments that have the same location ID as Seattle?

```
SELECT department_name
FROM departments
WHERE location_id = ( SELECT location_id FROM locations WHERE city = 'Seattle');
```

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

```
SELECT  first_name, last_name
FROM EMPLOYEES
WHERE salary >  (SELECT salary FROM employees WHERE last_name = 'Lorentz') AND
department_id = (SELECT department_id FROM employees WHERE last_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  first_name, last_name
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') ;
```

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

```
SELECT id, name
FROM d_events
WHERE theme_code =  (SELECT theme_code FROM d_events WHERE 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, MAX(salary)
FROM f_staffs
GROUP BY staff_type
HAVING MAX(salary) < (SELECT MAX(SALARY) FROM f_staffs 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, TO_CHAR(ROUND(AVG(salary),2),'$999999.99') "Average Salary"
FROM employees
GROUP BY department_id
HAVING AVG(salary) > ( SELECT salary from employees WHERE last_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, TO_CHAR(ROUND(MIN(salary),2),'$999999.99') "Minimum Salary"
FROM employees
GROUP BY department_id
HAVING MIN(salary) > ( SELECT MIN(salary) from employees WHERE department_id != 50);
```

10-3: Multiple-row subqueries

1. What will be returned by a query if it has a subquery that returns a null?

   Depends on the context in which the subquery is used such as in comparison, IN or NOT IN, and aggregates.

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
FROM d_songs
WHERE type_code IN ( SELECT code FROM d_types WHERE description IN ('Jazz', 'Pop'));
```

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

```
SELECT last_name
FROM employees
WHERE salary in ( SELECT MIN(salary) FROM employees GROUP 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 subqery.

```
SELECT last_name
FROM f_staffs
WHERE NVL(salary,0) = ( SELECT MIN(NVL(salary,0)) FROM f_staffs);
```

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 …
SELECT *
FROM d_cds
 WHERE TO_NUMBER(year) < ( SELECT TO_NUMBER(year) FROM d_cds where title =
 'Carpe Diem');
```

B. Which employees have salaries lower than any one of the programmers in the IT department?

WHERE salary _____(SELECT salary …

```
SELECT last_name, salary
FROM employees
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 _____(SELECT year …

```
SELECT title
FROM d_cds
WHERE TO_NUMBER(year) IN ( SELECT  TO_NUMBER(year) FROM d_cds where title IN ( 'Carpe
Diem', 'Party Music for All Occasions'));
```

D. What song title has a duration longer than every type code 77 title?

WHERE duration _____(SELECT duration ..

```
SELECT title, duration
FROM d_songs
WHERE TO_NUMBER(REPLACE(duration,' min','')) > ALL ( SELECT
TO_NUMBER(REPLACE(duration,' min','')) FROM d_songs where type_code = 77);
```

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. TRUE
   ____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. FALSE
   ____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. FALSE
   ____d. WHERE color NOT IN -- If the inner query returns red, green, blue, black, and then the outer query could return white. TRUE
   ____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-2000. FALSE
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). FALSE
   _____ b. The query wants the names of employees who make the same salary as the smallest salary in any department. TRUE
   _____ c. The query first selects the employee ID and last name, and then compares that to the salaries in every department. FALSE
   _____ d. This query will not execute.TRUE

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.

   SELECT last_name, first_name, department_id, manager_id
   FROM employees
   WHERE (NVL(department_id,-1), NVL(manager_id,-1)) = (SELECT NVL(department_id,-1), NVL(manager_id,-1) 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.

    SELECT last_name, first_name, department_id, manager_id
    FROM employees
    WHERE NVL(department_id,-1) = (SELECT NVL(department_id,-1) FROM employees WHERE employee_id = 141)
    AND NVL(manager_id,-1) = (SELECT NVL(manager_id,-1) FROM employees WHERE employee_id = 141)
    AND employee_id != 141;

10-4 Correlated Subqueries

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

Correlated subqueries depends on the outer query for its values, meaning it references columns from the outer query within its condition. A non-correalted subqueries is independent of the outer query, it can be executed on its own without any reference to the outer query.

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

```
SELECT oe.last_name, oe.department_id, oe.salary
FROM employees oe
        WHERE oe.salary = (SELECT MAX(ie.salary) FROM employees ie WHERE
NVL(ie.department_id,-1) = NVL(oe.department_id,-1));
```

3. Examine the following select statement and finish it so that 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.

```
SELECT outer.last_name, outer.department_id, outer.salary
FROM employees outer
WHERE outer.employee_id IN (SELECT DISTINCT inner.manager_id
FROM employees  inner
WHERE inner.manager_id IS NOT NULL)
ORDER BY outer.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.

```
WITH max_calc_sal as (SELECT MAX(max_salary)/2 FROM jobs)
SELECT job_title
FROM jobs
WHERE jobs.max_salary > (SELECT * FROM max_calc_sal );
```

Practice 11