Sub query

- A sub query is a form of SQL statement that appear inside another SQL statement.
- It is also called a nested query.
- The statement containing a sub query is called parent statement.
- The parent statement use the rows returned by the sub query.
- Syntax:

  \[
  \text{SELECT \ select\_list} \\
  \text{FROM \ table} \\
  \text{WHERE \ expr \ operator} \\
  (\text{SELECT \ select\_list \ FROM \ table});
  \]

- The subquery (inner query) executes once before the main query.
- The result of the subquery is used by the main query (outer query).
Single-Row Subqueries

- Return only one row
- Use single-row comparison operators

<table>
<thead>
<tr>
<th>Operator</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>=</td>
<td>Equal to</td>
</tr>
<tr>
<td>&gt;</td>
<td>Greater than</td>
</tr>
<tr>
<td>&gt;=</td>
<td>Greater than or equal to</td>
</tr>
<tr>
<td>&lt;</td>
<td>Less than</td>
</tr>
<tr>
<td>&lt;=</td>
<td>Less than or equal to</td>
</tr>
<tr>
<td>&lt;&gt;</td>
<td>Not equal to</td>
</tr>
</tbody>
</table>
Using a Subquery to Solve a Problem

- Who has a salary greater than Abel’s?

Main Query:
- select the name from employees.

Sub query:
What is Abel’s salary?

Query:
- SELECT name FROM employees
  WHERE salary >
  (SELECT salary FROM employees
   WHERE name = 'Abel');
Executing Single-Row Subqueries

- SELECT last_name, job_id, salary
  FROM employees
  WHERE job_id = (SELECT job_id
                  FROM employees
                  WHERE employee_id = 141)
  AND salary >
  (SELECT salary
   FROM employees
   WHERE employee_id = 143);
Using Group Functions in a Subquery

- SELECT last_name, job_id, salary
  FROM employees
  WHERE salary = (SELECT MIN(salary)
                  FROM employees);
The HAVING Clause with Subqueries

- SELECT department_id, MIN(salary)
  FROM employees
  GROUP BY department_id
  HAVING MIN(salary) > (SELECT MIN(salary)
    FROM employees
    WHERE department_id = 50);
What is Wrong with this Statement?

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

- ERROR at line 4:
  ORA-01427: single-row subquery returns more than one row.
Multiple-Row Subqueries

- Return more than one row
- Use multiple-row comparison operators

<table>
<thead>
<tr>
<th>operator</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN</td>
<td>Equal to any member in the list</td>
</tr>
<tr>
<td>ANY</td>
<td>Compare value to each value returned by the sub query</td>
</tr>
<tr>
<td>ALL</td>
<td>Compare value to every value returned by the sub query</td>
</tr>
</tbody>
</table>
IN Operator

- IN:

(Q): Display the Details of all the Employees Whose Salaries are Matching with Least Investments of Departments?

(A):

SQL > Select Ename Sal Deptno from Emp Where Sal IN (Select Min(Sal) From Emp Group By Deptno);
ANY

ANY:-> Means Less Than The Maximum Value in the List.

1)  < Any means less than at least one value
2)  >Any means greater than at least one value
ALL

- <ALL:-> Means Less Than The Minimum Value in the List.
  1) < all means less than every value in list
  2) > all means greater than the every value
Difference between all and any

- Using the $>$ comparison operator as an example:
  - $> \text{all}$ means greater than every value, or greater than the maximum value. For example, $> \text{all} (1, 2, 3)$ means greater than 3.
  - $> \text{any}$ means greater than at least one value, or greater than the minimum value. Therefore, $> \text{any} (1, 2, 3)$ means greater than 1.