

Suggested Solution

Database Programming with SQL

9-1: Using GROUP BY and HAVING Clauses

Practice Activities

Objectives

- Construct and execute a SQL query using GROUP BY
- Construct and execute a SQL query using GROUP BY ... HAVING
- Construct and execute a GROUP BY on more than one column
- Nest group functions

1. Each of the following SQL queries has an error. Find the error and correct it. Use Oracle Application Express to verify that your corrections produce the desired results.

a. `SELECT manager_id
FROM employees
WHERE AVG(salary) < 16000
GROUP BY manager_id;`

Solution:

```
SELECT manager_id, ROUND(avg(salary))  
FROM employees  
GROUP BY manager_id  
HAVING avg(salary) < 16000;
```

b. `SELECT cd_number, COUNT(title)
FROM d_cds
WHERE cd_number < 93;`

Solution:

```
SELECT cd_number, COUNT(title)  
FROM d_cds  
WHERE cd_number < 93  
GROUP BY cd_number;
```

c. `SELECT ID, MAX(ID), artist AS Artist
FROM d_songs
WHERE duration IN('3 min', '6 min', '10 min')
HAVING ID < 50
GROUP by ID;`

Solution:

```
SELECT ID, MAX(ID), artist AS Artist
```

```
FROM d_songs
WHERE duration IN('3 min', '6 min', '10 min')
GROUP by ID, artist
HAVING ID < 50;
```

- d. SELECT loc_type, rental_fee AS Fee
FROM d_venues
WHERE id <100
GROUP BY "Fee"
ORDER BY 2;

Solution:

```
SELECT loc_type, rental_fee AS Fee
FROM d_venues
WHERE id <100
GROUP BY loc_type, rental_fee
ORDER BY 2;
```

2. Write a query that will return both the maximum and minimum average salary grouped by department from the employees table.

```
SELECT MAX(AVG(salary)) , MIN(AVG(salary))
FROM employees
GROUP BY department_id ;
```

3. Write a query that will return the average of the maximum salaries in each department for the employees table.

Solution:

```
SELECT AVG(MAX(salary))
FROM employees
GROUP BY department_id ;
```

Database Programming with SQL

9-3: Set Operators

Practice Activities

Objectives

- Define and explain the purpose of SET operators
- Use a set operator to combine multiple queries into a single query
- Control the order of rows returned using set operators

1. Write one query to return the employee_id, job_id, hire_date, and department_id of all employees and a second query listing employee_id, job_id, start_date, and department_id from the job_history table and combine the results as one single output. Make sure you suppress duplicates in the output.

Solution:

```
SELECT employee_id, hire_date, job_id, department_id
FROM employees
UNION
SELECT employee_id, start_date, job_id, department_id
FROM job_history
```

2. List all employees who have not changed jobs even once. (Such employees are not found in the job_history table)

Solution:

```
SELECT employee_id, job_id
FROM employees
MINUS
SELECT employee_id, job_id
FROM job_history
```

3. List the employees that HAVE changed their jobs at least once.

Solution:

```
SELECT employee_id, job_id
FROM job_history
MINUS
SELECT employee_id, job_id
FROM employees
```

4. Using the UNION operator, write a query that displays the employee_id, job_id, and salary of ALL present and past employees. If a salary is not found, then just display a 0 (zero) in its place.

Solution:

```
SELECT employee_id, job_id, salary
FROM employees
UNION
SELECT employee_id, job_id, 0
FROM job_history
```

Database Programming with SQL 10-1: Fundamentals of Subqueries Practice Activities

Objectives

- Define and explain the purpose of subqueries for retrieving data
- Construct and execute a single-row subquery in the WHERE clause
- Distinguish between single-row and multiple-row subqueries

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

Solution:

```
SELECT name
FROM d_events
WHERE cost >
(SELECT cost
FROM d_events
WHERE id = 100);
```

2. Find the track number of the song that has the same CD number as “Party Music for All Occasions.”

Solution:

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

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

Solution:

```
SELECT name
FROM d_events
WHERE theme_code =
(SELECT code
FROM d_themes
WHERE description = 'Tropical');
```

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

Solution:

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

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

Solution:

```
SELECT last_name
FROM f_staffs
WHERE staff_type <>
(SELECT staff_type
FROM f_staffs
WHERE last_name = 'Miller');
```

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

Solution:

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

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

Practice Activities

Objectives

- Construct and execute a single-row subquery in the WHERE clause or HAVING clause
- Construct and execute a SELECT statement using more than one subquery
- Construct and execute a SELECT statement using a group function in the subquery

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.

Solution:

```
SELECT *  
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.

Solution:

```
SELECT *  
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?

Solution:

```
SELECT 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?

Solution:

```
SELECT staff_type  
FROM f_staffs  
WHERE 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.

Solution:

```
SELECT department_id, AVG(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.

Solution:

```
SELECT department_id, min(salary)  
FROM employees  
GROUP BY department_id  
HAVING min (salary)>  
(SELECT MIN (salary) FROM employees WHERE department_id <> 50);
```