

Database Programming with SQL 7-1: Oracle Equijoin and Cartesian Product Activities

- Vocabulary: Identify the vocabulary word for each definition below
 - Results from an invalid or omitted join condition; all combinations of rows are displayed
 - Answer: cartesian product
 - Values in a column in one table are equal to a value in another table; also called an inner join or simple join
 - Answer: equijoin
 - Connection command exclusive to a specific company
 - Answer: oracle proprietary joins
 - Gives a table another name to simplify queries and improve performance
 - Answer: table aliases
 - Display data from two or more related tables
 - Answer: join commands
- Try It / Solve It
 - 1. Create a Cartesian product that displays the columns in the d_play_list_items and the d_track_listings in the DJs on Demand database
 - ```
SELECT *
FROM d_play_list_items, d_track_listings;
```
  - 2. Correct the Cartesian product produced in question 1 by creating an equijoin using a common column
    - ```
SELECT *  
FROM d_play_list_items p  
JOIN d_track_listings t ON p.track_id = t.track_id;
```
 - 3. Write a query to display the title, type, description, and artist from the DJs on Demand database
 - ```
SELECT title, type, description, artist
FROM d_track_listings;
```
  - 4. Rewrite the query in question 3 to select only those titles with an ID of 47 or 48
    - ```
SELECT title, type, description, artist  
FROM d_track_listings  
WHERE id IN (47, 48);
```
 - 5. Write a query that extracts information from three tables in the DJs on Demand database, the d_clients table, the d_events table, and the d_job_assignments table
 - ```
SELECT c.client_name, e.event_name, j.job_id
```

- ```

FROM d_clients c
JOIN d_job_assignments j ON c.client_id = j.client_id
JOIN d_events e ON j.event_id = e.event_id;

```
- 6. Create and execute an equijoin between DJs on Demand tables d_track_listings and d_cds. Return the song_id and the title only
 - SELECT t.song_id, t.title

FROM d_track_listings t

JOIN d_cds c ON t.cd_id = c.cd_id;
 - 7. Mark T for the statements that are true and F for the statements that are false
 - a. A join is a type of query that gets data from more than one table based on columns with the same name
 - Answer: True
 - b. To join tables using an equijoin, there must be a common column in both tables and that column is usually a primary key in one of the tables
 - Answer: True
 - c. A Cartesian product occurs because the query does not specify a WHERE clause
 - Answer: True
 - d. Table aliases are required to create a join condition
 - Answer: False
 - e. If a table alias is used for a table name in the FROM clause, it must be substituted for the table name throughout the SELECT statement
 - Answer: True
 - f. Table alias must be only one character in length
 - Answer: False
 - g. A simple join or inner join is the same as an equijoin
 - Answer: True
 - 8. What advantage does being able to combine data from multiple tables have for a business?
 - Being able to combine data from multiple tables for a business is important to gain insights and make decisions by analyzing data across the various elements of a business and better understand how to make improvements from a holistic view.

Database Programming with SQL 7-2: Oracle Nonequijoins and Outer Joins

Practice Activities

- Try It / Solve It
 - 1. Create a join based on the cost of the event between the DJs on Demand tables D_EVENTS and D_PACKAGES. Show the name of the event and the code for each event

- SELECT e.event_name, p.package_code
FROM d_events e
JOIN d_packages p ON e.cost = p.cost;
- 2. Using the Oracle database, create a query that returns the employee last name, salary, and job-grade level based on the salary. Select the salary between the lowest and highest salaries
 - SELECT last_name, salary, job_grade
FROM employees
WHERE salary BETWEEN (SELECT MIN(salary) FROM employees)
AND (SELECT MAX(salary) FROM employees);
- 3. What condition requires the creation of a nonequijoin?
 - A nonequijoin is required when columns between tables do not exactly match
- 4. Rewrite the following nonequijoin statement using the logical condition operators (AND, OR, NOT): WHERE a.ranking BETWEEN g.lowest_rank AND g.highest_rank
 - WHERE a.ranking >= g.lowest_rank AND a.ranking <= g.highest_rank
- 5. How do you know when to use a table alias and when not to use a table alias?
 - You would use a table alias when a you want to shorten the long table names and improve readability for complex queries to make it easy to differentiate between tables
- 6. What kind of join would you use if you wanted to find data between a range of numbers?
 - You would use INNER JOIN and BETWEEN to join two tables and find the data between a range of numbers
- 7. You need to produce a report for Global Fast Foods showing customers and orders. A customer must be included on the report even if the customer has had no orders
 - SELECT c.customer_id, c.customer_name, o.order_id, o.order_date,
o.order_amount
FROM customers c
LEFT JOIN orders o ON c.customer_id = o.customer_id
ORDER BY c.customer_name;
- 8. Create a query of the Oracle database that shows employee last names, department IDs, and department names. Include all employees even if they are not assigned to a department
 - SELECT e.last_name, e.department_id, d.department_name
FROM employees e
LEFT JOIN departments d
ON e.department_id = d.department_id;
- 9. Modify the query in problem 8 to return all the department IDs even if no employees are assigned to them

- SELECT e.last_name, e.department_id, d.department_name
FROM employees e
RIGHT JOIN departments d
ON e.department_id = d.department_id;
- 10. There are one or more errors in each of the following statements. Describe the errors and correct them.
 - a. WHERE e.department_id(+) = d.department_id (+);
 - b. SELECT e.employee id, e. last name, d. location id FROM employees, departments WHERE e.department_id = d.department_id(+);
- 11. Create a query that will show all CD titles and song IDs in the DJs on Demand database even if there is no CD number in the track-listings table
 - SELECT c.cd_title, t.song_id
FROM CDs c
LEFT JOIN trackListings t ON c.cd_number = t.cd_number;
- 12. How many times has someone asked you: “What do you want to be when you grow up?” For most of us, the first thing that comes to mind is something like business manager, engineer, teacher, game designer, doctor, scientist, computer programmer, or accountant -- all pretty much traditional career choices. Have you ever thought about working in an odd job or nontraditional career? There are people who are professional shoppers for busy executives, directors of zoos, recipe designers, insecticide chemists, golf-course designers, and turf managers. Picture yourself in a dream job or nontraditional career doing something that you think would be interesting, life fulfilling, and profitable. Use Internet resources to explore your idea. Write a brief description of the job to share with the class
 - I always wondered whether I should pursue a career as a veterinarian because I love animals. It hurts to see stray animals and pets be hurt or sick because they cannot communicate their needs.

Database Programming with SQL 8-1: Group Functions Practice Activities

- Vocabulary: Identify the vocabulary word for each definition below
 - Calculates average value excluding nulls
 - Answer: AVG
 - Returns the number of rows with non-null values for the expression
 - Answer: COUNT
 - For two sets of data with approximately the same mean, the greater the spread, the greater the standard deviation
 - Answer: STDDEV
 - Operate on sets of rows to give one result per group
 - Answer: GROUP BY
 - Returns minimum value ignoring nulls
 - Answer: MIN

- Used with columns that store numeric data to calculate the spread of data around the mean
 - Answer: VARIANCE
- Calculates the sum ignoring null values
 - Answer: SUM
- Returns the maximum value ignoring nulls
 - Answer: MAX
- To gather into a sum or whole
 - Answer: SUM
- Try It / Solve It
 - 1. Define and give an example of the seven group functions: AVG, COUNT, MAX, MIN, STDDEV, SUM, and VARIANCE
 - AVG
 - Definition: Calculates the mean for numeric columns
 - Example:


```
SELECT department_id, AVG(salary) AS average_salary
FROM employees
GROUP BY department_id;
```
 - COUNT
 - Definition: Calculates the number of rows in the data
 - Example:


```
SELECT department_id, COUNT(*) AS employee_count
FROM employees
GROUP BY department_id;
```
 - MAX
 - Definition: Returns the largest numeric value from a column
 - Example:


```
SELECT department_id, COUNT(*) AS employee_count
FROM employees
GROUP BY department_id;
```
 - MIN
 - Definition: Returns the smallest numeric value from a column
 - Example:


```
SELECT department_id, MIN(salary) AS lowest_salary
FROM employees
GROUP BY department_id;
```
 - STDDEV
 - Definition: Calculates the measure of spread for the values around the mean for numeric data
 - Example:

```
SELECT department_id, STDDEV(salary) AS salary_stddev
FROM employees
GROUP BY department_id;
```

■ SUM

- Definition: Calculates the total of the numeric data through addition
- Example:

```
SELECT department_id, SUM(salary) AS total_salary
FROM employees
GROUP BY department_id;
```

■ VARIANCE

- Definition: Calculator how much values differ from the mean for numeric data
- Example:

```
SELECT department_id, VARIANCE(salary) AS salary_variance
FROM employees
GROUP BY department_id;
```

- 2. Create a query that will show the average cost of the DJs on Demand events. Round to two decimal places
 - SELECT ROUND(AVG(cost), 2) AS avg_event_cost

FROM events;
- 3. Find the average salary for Global Fast Foods staff members whose manager ID is 19
 - SELECT AVG(salary) AS avg_salary

FROM staff

WHERE manager_id = 19;
- 4. Find the sum of the salaries for Global Fast Foods staff members whose IDs are 12 and 9
 - SELECT SUM(salary) AS total_salary

FROM staff

WHERE staff_id IN (12, 9);
- 5. Using the Oracle database, select the lowest salary, the most recent hire date, the last name of the person who is at the top of an alphabetical list of employees, and the last name of the person who is at the bottom of an alphabetical list of employees. Select only employees who are in departments 50 or 60
 - SELECT MIN(salary) AS lowest_salary, MAX(hire_date) AS

most_recent_hire_date, MIN(last_name) AS first_alphabetical_last_name,

MAX(last_name) AS last_alphabetical_last_name

FROM employees

WHERE department_id IN (50, 60);
- 6. Your new Internet business has had a good year financially. You have had 1,289 orders this year. Your customer order table has a column named total_sales. If you submit the following query, how many rows will be returned?

- SELECT sum(total_sales)
FROM orders;
 - Answer: It will return 1 row
- 7. You were asked to create a report of the average salaries for all employees in each division of the company. Some employees in your company are paid hourly instead of by salary. When you ran the report, it seemed as though the averages were not what you expected—they were much higher than you thought! What could have been the cause?
 - The cause could have been that the total earnings of wage employees were not converted to salaries and possibly the inclusion of extra earnings such as overtime and bonuses.
- 8. Employees of Global Fast Foods have birth dates of July 1, 1980, March 19, 1979, and March 30, 1969. If you select MIN(birthdate), which date will be returned?
 - The oldest birthdate of March 30, 1969 will be returned
- 9. Create a query that will return the average order total for all Global Fast Foods orders from January 1, 2002, to December 21, 2002
 - SELECT AVG(order_total) AS avg_order_total
FROM orders
WHERE order_date BETWEEN '2002-01-01' AND '2002-12-21';
- 10. What was the hire date of the last Oracle employee hired?
 - SELECT MAX(hire_date) AS last_hired_date
FROM employees
WHERE company_name = 'Oracle';
- 11. In the following SELECT clause, which value returned by the SELECT statement will be larger?
 - SELECT SUM(operating_cost), AVG(operating_cost)
 - Answer: The SUM(operating_cost) will always be larger than the AVG(operating_cost) because the SUM(operating_cost) calculates the total cost by adding up the values while AVG(operating_cost) includes adding the values and then dividing by the amount of values. Thus, SUM would always give you a larger value and AVG will always give you a smaller value

Database Programming with SQL 8-2: Count, Distinct, NVL Practice Activities

- Vocabulary: Identify the vocabulary word for each definition below
 - Returns the number of non-null values in the expression column
 - Answer: COUNT
 - The keyword used to return only non-duplicate values or combinations of non-duplicate values in a query
 - Answer: DISTINCT

- Returns the number of unique non-null values in the expression column
 - Answer: COUNT(DISTINCT)
- Try It / Solve It
 - 1. How many songs are listed in the DJs on Demand D_SONGS table?
 - SELECT COUNT(*)
FROM D_SONGS;
 - 2. In how many different location types has DJs on Demand had venues?
 - SELECT COUNT(DISTINCT location_type)
FROM venues;
 - 3. The d_track_listings table in the DJs on Demand database has a song_id column and a cd_number column. How many song IDs are in the table and how many different CD numbers are in the table?
 - SELECT COUNT(song_id), COUNT(DISTINCT cd_number)
FROM d_track_listings;
 - 4. How many of the DJs on Demand customers have email addresses?
 - SELECT COUNT(email)
FROM customers
WHERE email IS NOT NULL;
 - 5. Some of the partners in DJs on Demand do not have authorized expense amounts (auth_expense_amt). How many partners do have this privilege?
 - SELECT COUNT(*)
FROM D_PARTNERS
WHERE auth_expense_amt IS NOT NULL;
 - 6. What values will be returned when the statement below is issued?

ID	type	shoe_color
456	oxford	brown
463	sandal	tan
262	heel	black
433	slipper	tan

```
SELECT COUNT(shoe_color), COUNT(DISTINCT shoe_color)
FROM shoes;
```

- COUNT(shoe_color) will return 4
 - COUNT(DISTINCT) will return 3
- 7. Create a query that will convert any null values in the auth_expense_amt column on the DJs on Demand D_PARTNERS table to 100000 and find the average of the values in this column. Round the result to two decimal places
 - SELECT ROUND(AVG(NVL(auth_expense_amt, 100000)), 2)
FROM D_PARTNERS;
- 8. Which statement(s) is/are True about the following SQL statement:
SELECT AVG(NVL(selling_bonus, 0.10))
FROM bonuses;

- a. The datatypes of the values in the NVL clause can be any datatype except date data
 - Answer: False
- b. If the selling_bonus column has a null value, 0.10 will be substituted
 - Answer: False
- c. There will be no null values in the selling_bonus column when the average is calculated
 - Answer: True
- d. This statement will cause an error. There cannot be two functions in the SELECT statement
 - Answer: False
- 9. Which of the following statements is/are TRUE about the following query?
SELECT DISTINCT colors, sizes
FROM items;
 - a. Each color will appear only once in the result set
 - Answer: False
 - b. Each size will appear only once in the result set
 - Answer: False
 - c. Unique combinations of color and size will appear only once in the result set
 - Answer: True
 - d. Each color and size combination will appear more than once in the result set
 - Answer: False