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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

   True

   d. Table aliases are required to create a join condition

   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

   True

   f. Table alias must be only one character in length

   False

   g. A simple join or inner join is the same as an equijoin

   True

   - 8. What advantage does being able to combine data from multiple tables have for a business?

   It is important when you are making decisions and trying to gain business intelligence. It is critical to analyze data in multiple or various elements in order to make to plan for better quality of care

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,
E.EVENT_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
E.LAST_NAME,
E.SALARY,
G.GRADE_LEVEL
FROM
EMPLOYEES E
JOIN
JOB_GRADES G ON E.SALARY BETWEEN G.LOWEST_SAL AND
G.HIGHEST_SAL;
```

3. What condition requires the creation of a nonequijoin?

Conditions nonequijoins need is at least two tables with a relationship that can't be defined by an exact match using the equality operator (=).

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?

Use a table alias when:

- **Referring to multiple tables in a query**
- **Making the query readable by shortening the table names**

Avoid using a table alias if:

- **When the query is simple and does not involve multiple tables or column name conflicts.**

6. What kind of join would you use if you wanted to find data between a range of numbers?

To find data between a range of numbers, you would typically use an INNER JOIN with a BETWEEN clause in the on condition when joining two tables.

7. You need to produce a report for Global Fast Foods showing customers and orders. A customer. To create a report showing customers and their orders, a **LEFT JOIN** can be used to include all customers, even those who have not placed any 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 (+);
        i. Answer : **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 a 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, recipedesigners, 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

I would like to be an artist , because it's such a fun and inspiring career and I love the way art impacts people in different ways

8-1: Group Functions

Vocabulary

- 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.

   Definition: Calculates the average value of a numeric column.
   Example: SELECT AVG(salary) FROM employees;
   Definition: Counts the number of rows in a result set, or the number of non-NULL values in a specific column.
   Example: SELECT COUNT(*) FROM employees;

   This counts the total number of rows (employees) in the table.
   Definition: Returns the highest value in a specified column.
   Example: SELECT MAX(salary) FROM employees;
   This query retrieves the highest salary among all employees
   Definition: Returns the lowest value in a specified column.
   Example: SELECT MIN(salary) FROM employees;
   This query retrieves the lowest salary among all employees.
   Definition: Calculates the standard deviation of a set of numeric values.
   Example: SELECT STDDEV(salary) FROM employees;
   This returns the standard deviation of employee salaries
   Definition: Returns the total sum of a numeric column.
   Example: SELECT SUM(salary) FROM employees;
   This query calculates the total salary paid to all employees.

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;
```

Based on the following query 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?

Based on the following scenario the likely cause for the unexpected high average salary report could be likely due to the hourly-paid employees wages weren't properly converted to annual values or consistent format

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?

   If you select MIN(birthdate), the oldest date will be returned, which is March 30, 1969.

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)
```

The value returned by SUM(operating_cost) will always be larger than AVG(operating_cost), as the SUM function totals all operating costs, while the AVG function calculates the average of the operating costs across rows, which will naturally be smaller than the sum.

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. How many different location types did DJs on Demand have 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 data type except date data

False

b. If the selling_bonus column has a null value, 0.10 will be substituted

False

c. There will be no null values in the selling_bonus column when the average is calculated

True

d. This statement will cause an error. There cannot be two functions in the SELECT statement

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

  False

  b. Each size will appear only once in the result set

  False

  c. Unique combinations of color and size will appear only once in the result set

  True

  d. Each color and size combination will appear more than once in the result set

  False