

## SQL Database Programming: Section 7-1: Oracle Equijoin and Cartesian Product

### Vocabulary

**CARTESIAN PRODUCT JOIN** – Results from an invalid or omitted join condition; all combinations of rows are displayed

**EQUIJOIN** – Values in a column in one table are equal to a value in another table; also called an inner join or simple join

**PROPRIETARY JOIN** – Connection command exclusive to a specific company

**TABLE ALIAS** – Gives a table another name to simplify queries and improve performance

**JOIN** – Display data from two or more related tables

### 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 DIs on Demand database.

The screenshot shows the Oracle APEX SQL Workshop interface. The SQL Commands panel displays the following query:

```
1 SELECT *
2
3 FROM D_PLAY_LIST_ITEMS, D_TRACK_LISTINGS;
4
5
```

The Results panel shows the output of the query, which is a Cartesian product of the two tables. The results are displayed in a table with the following columns: EVENT\_ID, SONG\_ID, COMMENTS, SONG\_ID, CD\_NUMBER, and TRACK. The table contains 10 rows of data, showing all combinations of rows from the two tables.

EVENT_ID	SONG_ID	COMMENTS	SONG_ID	CD_NUMBER	TRACK
100	45	Play late	45	92	1
100	45	Play late	46	93	1
100	45	Play late	47	91	2
100	45	Play late	48	95	5
100	45	Play late	49	91	3
100	46	-	45	92	1
100	46	-	46	93	1
100	46	-	47	91	2
100	46	-	48	95	5
100	46	-	49	91	3

More than 10 rows available. Increase rows selector to view more rows.

2. Correct the Cartesian product produced in question 1 by creating an equijoin using a common column.

**APEX** App Builder **SQL Workshop** Team Development Gallery Search ? ?

Schema: US\_A296\_SQL\_S18\_ADMIN

Language: SQL Rows: 10 Clear Command Find Tables Save Run

```

1
2 SELECT *
3 FROM D_PLAY_LIST_ITEMS playlist, D_TRACK_LISTINGS track
4 WHERE playlist.SONG_ID = track.SONG_ID;

```

**Results** Explain Describe Saved SQL History

EVENT_ID	SONG_ID	COMMENTS	SONG_ID	CD_NUMBER	TRACK
100	45	Play late	45	92	1
100	46	-	46	93	1
100	47	Play early	47	91	2
105	48	Play after cake cutting	48	95	5
105	49	Play first	49	91	3
105	47	Play for the father	47	91	2

6 rows returned in 0.00 seconds Download

3. Write a query to display the title, type, description, and artist from the DJs on Demand database.

**APEX** App Builder **SQL Workshop** Team Development Gallery Search ? ?

Schema: US\_A296\_SQL\_S18\_ADMIN

Language: SQL Rows: 10 Clear Command Find Tables Save Run

```

1
2 SELECT song.TITLE, song.TYPE_CODE, type.DESRIPTION, song.ARTIST
3 FROM D_SONGS song, D_TYPES type
4 WHERE song.TYPE_CODE = type.CODE;

```

**Results** Explain Describe Saved SQL History

TITLE	TYPE_CODE	DESCRIPTION	ARTIST
Its Finally Over	12	Pop	The Hobbits
Im Going to Miss My Teacher	12	Pop	Jane Pop
Hurrah for Today	77	New Age	The Jubilant Trio
Meet Me At the Altar	1	Jazz	Bobby West
Lets Celebrate	77	New Age	The Celebrants
All These Years	88	Country	Diana Crooner

6 rows returned in 0.01 seconds Download

4. Rewrite the query in question 3 to select only those titles with an ID of 47 or 48.

The screenshot shows the APEX SQL Workshop interface. The SQL command is as follows:

```

1
2 SELECT song.TITLE, song.TYPE_CODE, type.DESRIPTION, song.ARTIST
3 FROM D_SONGS song, D_TYPES type
4 WHERE song.ID = 47 OR song.ID = 48;

```

The results are displayed in a table with the following columns: TITLE, TYPE\_CODE, DESCRIPTION, and ARTIST. The table contains 10 rows of data.

TITLE	TYPE_CODE	DESCRIPTION	ARTIST
Hurrah for Today	77	Jazz	The Jubilant Trio
Meet Me At the Altar	1	Jazz	Bobby West
Hurrah for Today	77	Pop	The Jubilant Trio
Meet Me At the Altar	1	Pop	Bobby West
Hurrah for Today	77	Reggae	The Jubilant Trio
Meet Me At the Altar	1	Reggae	Bobby West
Hurrah for Today	77	Country	The Jubilant Trio
Meet Me At the Altar	1	Country	Bobby West
Hurrah for Today	77	New Age	The Jubilant Trio
Meet Me At the Altar	1	New Age	Bobby West

10 rows returned in 0.00 seconds [Download](#)

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.

The screenshot shows the APEX SQL Workshop interface. The SQL command is as follows:

```

1
2 SELECT c.CLIENT_NUMBER, c.FIRST_NAME, c.LAST_NAME, c.PHONE, e.NAME, e.EVENT_DATE, j.JOB_DATE, j.STATUS
3 FROM D_CLIENTS c, D_EVENTS e, D_JOB_ASSIGNMENTS j
4 WHERE c.CLIENT_NUMBER = e.CLIENT_NUMBER AND e.ID = j.EVENT_ID;

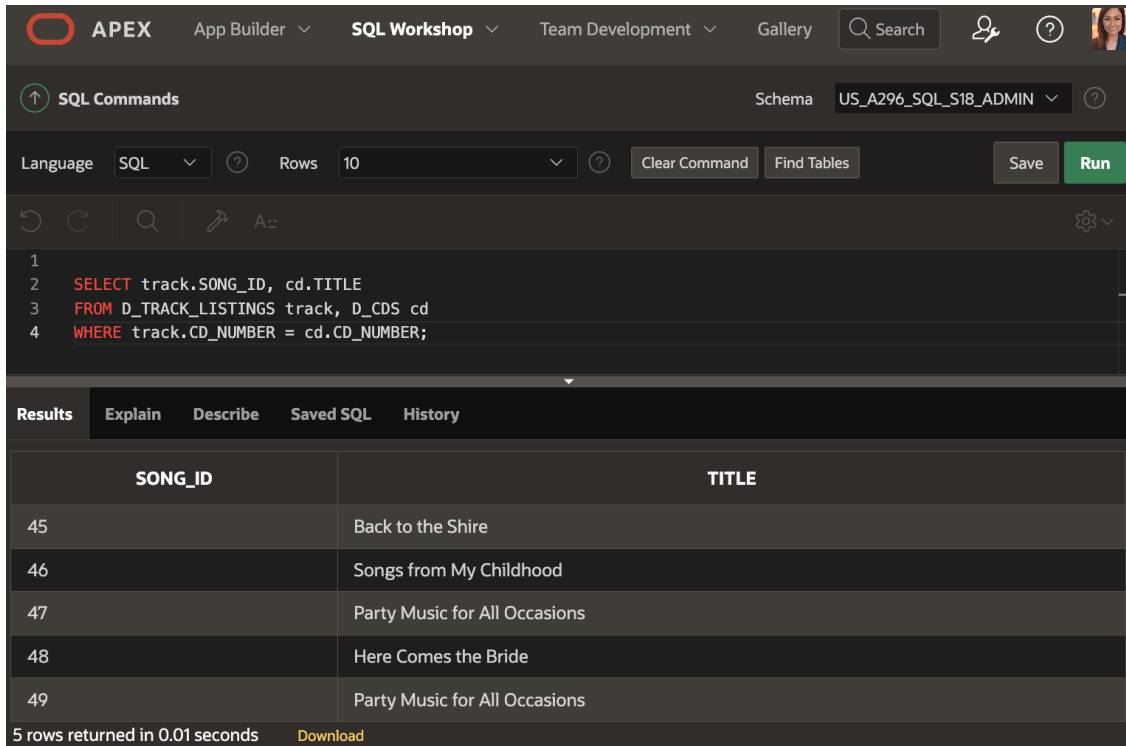
```

The results are displayed in a table with the following columns: CLIENT\_NUMBER, FIRST\_NAME, LAST\_NAME, PHONE, NAME, EVENT\_DATE, JOB\_DATE, and STATUS. The table contains 1 row of data.

CLIENT_NUMBER	FIRST_NAME	LAST_NAME	PHONE	NAME	EVENT_DATE	JOB_DATE	STATUS
6133	Lauren	Vigil	4072220090	Vigil wedding	28-Apr-2004	02-Feb-2004	Visited

1 rows returned in 0.02 seconds [Download](#)

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.



The screenshot shows the APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. The 'SQL Commands' tab is active, showing a query in the editor. The schema is set to 'US\_A296\_SQL\_S18\_ADMIN'. The query is as follows:

```

1
2 SELECT track.SONG_ID, cd.TITLE
3 FROM D_TRACK_LISTINGS track, D_CDS cd
4 WHERE track.CD_NUMBER = cd.CD_NUMBER;

```

The 'Results' tab is selected, displaying a table with 5 rows. The table has two columns: 'SONG\_ID' and 'TITLE'.

SONG_ID	TITLE
45	Back to the Shire
46	Songs from My Childhood
47	Party Music for All Occasions
48	Here Comes the Bride
49	Party Music for All Occasions

At the bottom, it states '5 rows returned in 0.01 seconds' and provides a 'Download' link.

7. Mark T for the statements that are true and F for the statements that are false.

- ☒ T a. A join is a type of query that gets data from more than one table based on columns with the same name.
- ☒ T 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.
- ☐ F c. A Cartesian product occurs because the query does not specify a WHERE clause.
- ☐ F d. Table aliases are required to create a join condition.
- ☒ T 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.
- ☐ F f. Table alias must be only one character in length.
- ☒ T g. A simple join or inner join is the same as an equijoin.

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

Being able to combine data from multiple tables can improve business's efficiency in analyzing the trends and patterns, depending on the type of business. For instance, when it comes to shopping, it allows businesses to monitor and analyze their customers' purchasing history in a comprehensive way, helping them make informed decisions.

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

### Try It / Solve It

1. Create a join based on the cost of the event between the DIs on Demand tables D\_EVENTS and D\_PACKAGES. Show the name of the event and the code for each event.

The screenshot shows the APEX SQL Workshop interface. The SQL command entered is:

```
1 SELECT e.NAME, e.PACKAGE_CODE, p.CODE
2 FROM D_EVENTS e, D_PACKAGES p
3 WHERE e.PACKAGE_CODE = p.CODE;
```

The results tab displays the following data:

NAME	PACKAGE_CODE	CODE
Peters Graduation	112	112
Vigil wedding	200	200

2 rows returned in 0.00 seconds

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.

The screenshot shows the APEX SQL Workshop interface. The SQL command entered is:

```
2
3 SELECT LAST_NAME, SALARY, GRADE_LEVEL
4 FROM EMPLOYEES e, JOB_GRADES j
5 WHERE SALARY BETWEEN LOWEST_SAL AND HIGHEST_SAL;
```

The results tab displays the following data:

LAST_NAME	SALARY	GRADE_LEVEL
King	24000	E
Kochhar	17000	E
De Haan	17000	E
Whalen	4400	B
Higgins	12000	D
Gietz	8300	C
Zlotkey	10500	D
Abel	11000	D
Taylor	8600	C
Grant	7000	C

3. What condition requires the creation of a nonequijoin?

A nonequijoin is equivalent to an ANSI JOIN ON (where the condition used is something other than equals)

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 Table Alias – if table names have long names

Do not use Table Alias – if using simple queries that has only one table and few columns

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

- Nonequijoin (using BETWEEN)

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.

The screenshot shows the APEX SQL Workshop interface. At the top, there's a navigation bar with 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. A search bar and user profile are also present. Below this, the 'SQL Commands' section is active, showing a schema of 'US\_A296\_SQL\_S18\_ADMIN'. The language is set to 'SQL' and the number of rows to display is '10'. The SQL command being executed is:

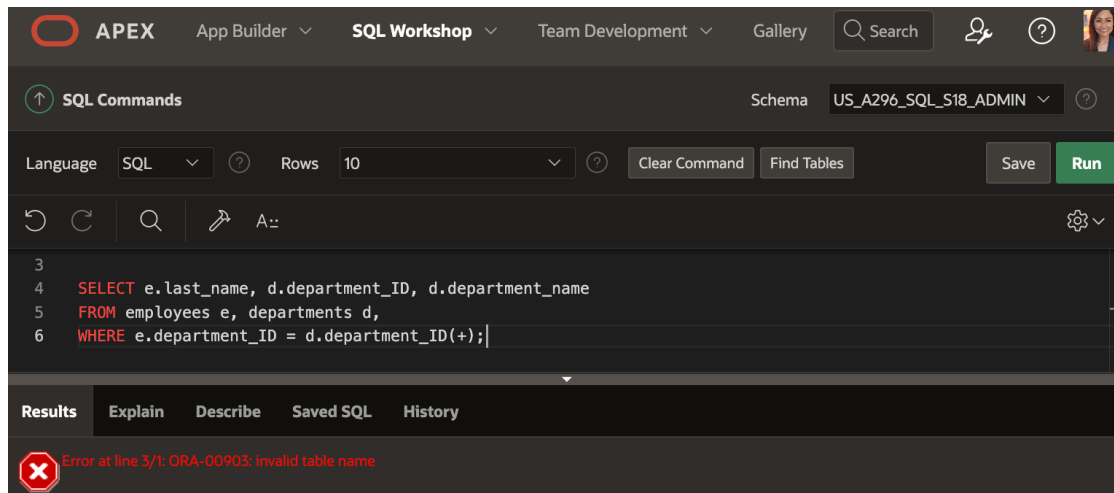
```
2  
3 SELECT c.ID, c.FIRST_NAME, c.LAST_NAME, o.ORDER_NUMBER, o.CUST_ID, o.ORDER_DATE, o.ORDER_TOTAL  
4 FROM F_CUSTOMERS c, F_ORDERS o  
5 WHERE c.ID = o.CUST_ID(+);
```

Below the command, there are tabs for 'Results', 'Explain', 'Describe', 'Saved SQL', and 'History'. The 'Results' tab is selected, showing a table with 2 rows:

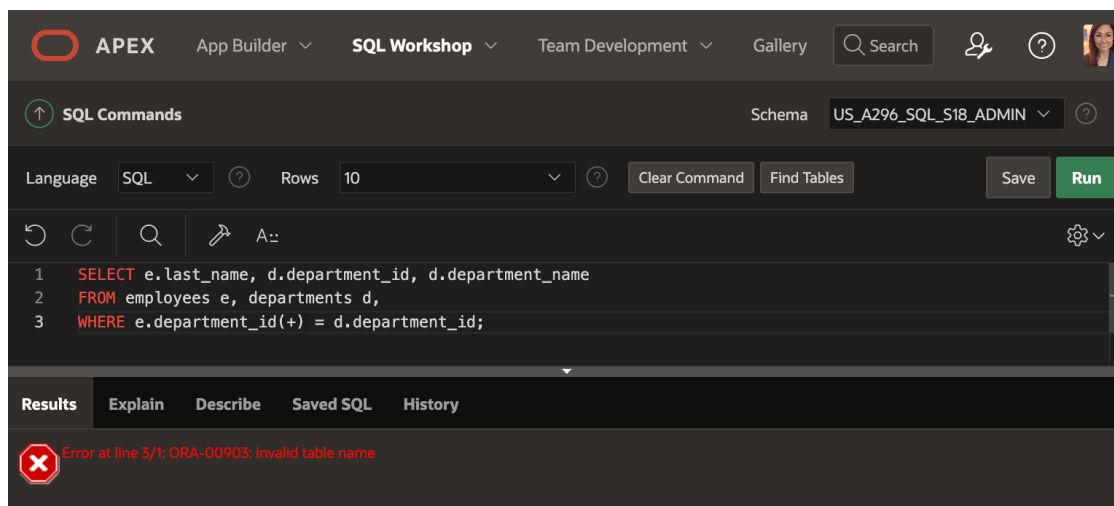
ID	FIRST_NAME	LAST_NAME	ORDER_NUMBER	CUST_ID	ORDER_DATE	ORDER_TOTAL
123	Cole	Bee	5678	123	10-Dec-2002	103.02
456	Zoe	Twee	-	-	-	-

At the bottom, it states '2 rows returned in 0.01 seconds' and provides a 'Download' link.

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.



9. Modify the query in problem 8 to return all the department IDs even if no employees are assigned to them.



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 (+);

→ (+) placed after the column name that I want all rows to be kept. For instance, in this case, keep the (+) after d.department\_id

→ 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(+);`

- Missing underscores in the `employee_id`, `last_name`, `location_id`
- Missing letters `e` and `d` after `employees` and `departments`. To avoid unintended results.
- `SELECT e.employee_id, e.last_name, d.location_id`  
`FROM employees e, departments d`  
`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.

The screenshot shows the APEX SQL Workshop interface. The top navigation bar includes 'APEX', 'App Builder', 'SQL Workshop', 'Team Development', and 'Gallery'. The 'SQL Commands' section is active, showing a query in the editor. The schema is set to 'US\_A296\_SQL\_S18\_ADMIN'. The query is as follows:

```
1  
2 SELECT cd.TITLE, track.SONG_ID  
3 FROM D_CDS cd, D_TRACK_LISTINGS track  
4 WHERE cd.CD_NUMBER = track.CD_NUMBER;
```

Below the editor, the 'Results' tab is selected, displaying a table with two columns: 'TITLE' and 'SONG\_ID'. The table contains five rows of data. At the bottom, it indicates '5 rows returned in 0.01 seconds' and provides a 'Download' link.

TITLE	SONG_ID
Back to the Shire	45
Songs from My Childhood	46
Party Music for All Occasions	47
Here Comes the Bride	48
Party Music for All Occasions	49



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.

Prior to pursuing my passion in healthcare, I initially studied for a bachelor's degree in communication arts. I have always been drawn to the dynamic and ever-evolving world of entertainment. The power of storytelling captivates me. As I grew older, I became fascinated by how animators blend artistry and technology, bringing characters to life and transporting audiences to magical worlds of fantasy. Although I don't have a talent for drawing, I do have a passion for the arts, it fuels my desire to contribute to this magical art form. It would be fun to envision myself collaborating with talented individuals, pushing creative boundaries, and crafting stories that would leave a lasting impact on viewers all over the world.