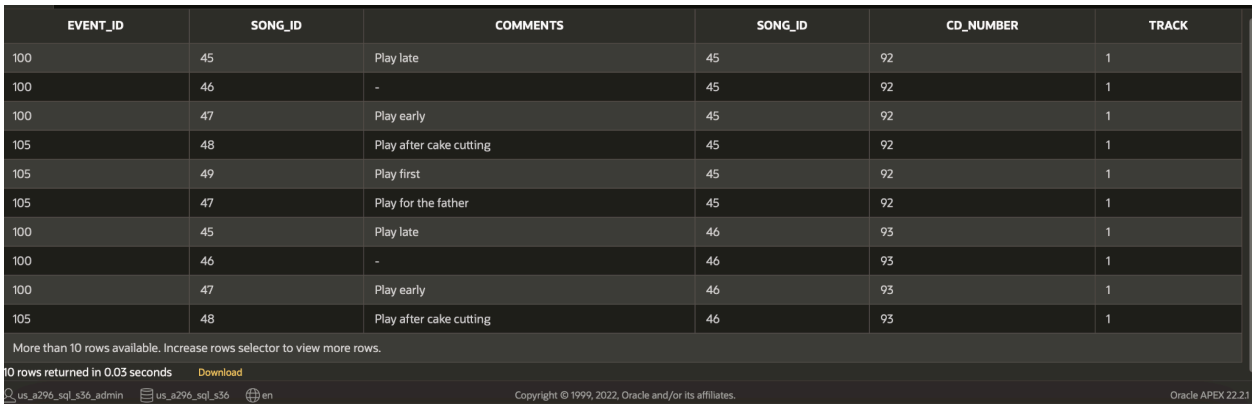
7-1: Oracle Equijoin and Cartesian Product

Vocabulary

Cartesian Product	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
Oracle 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

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.

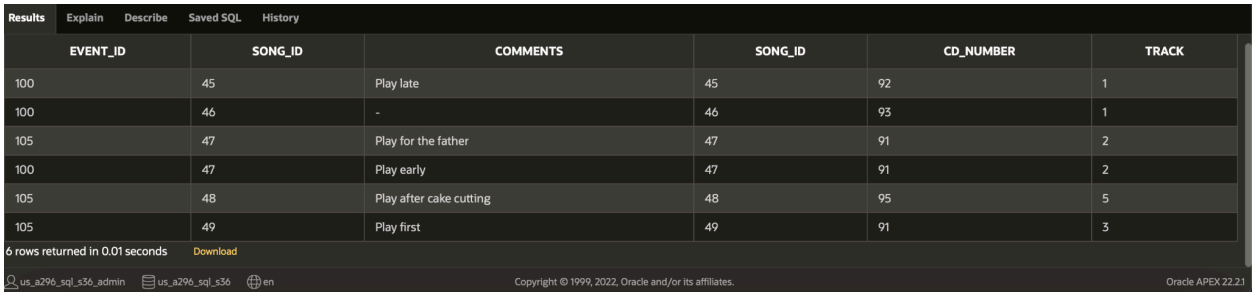
```
SELECT *
FROM d_play_list_items, d_track_listings;
```



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

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

```
SELECT p.*,
      t.*
FROM d_play_list_items p
JOIN d_track_listings t ON p.song_id = t.song_id;
```



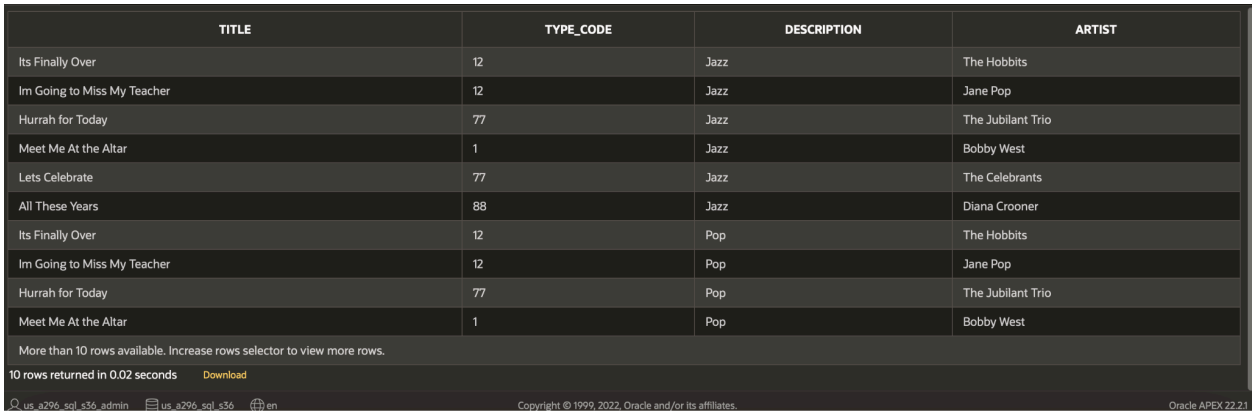
Results | Explain | Describe | Saved SQL | History

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

6 rows returned in 0.01 seconds Download

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

```
SELECT title,
      type_code,
      description,
      artist
FROM d_songs, d_types;
```



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

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

10 rows returned in 0.02 seconds Download

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

```
SELECT title,
      type_code,
      description,
      artist,
      song_id
FROM d_track_listings, d_songs, d_types
WHERE song_id IN (47, 48);
```

TITLE	TYPE_CODE	DESCRIPTION	ARTIST	SONG_ID
Its Finally Over	12	Jazz	The Hobbits	47
Its Finally Over	12	Jazz	The Hobbits	48
Im Going to Miss My Teacher	12	Jazz	Jane Pop	47
Im Going to Miss My Teacher	12	Jazz	Jane Pop	48
Hurrah for Today	77	Jazz	The Jubilant Trio	47
Hurrah for Today	77	Jazz	The Jubilant Trio	48
Meet Me At the Altar	1	Jazz	Bobby West	47
Meet Me At the Altar	1	Jazz	Bobby West	48
Lets Celebrate	77	Jazz	The Celebrants	47
Lets Celebrate	77	Jazz	The Celebrants	48

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

10 rows returned in 0.01 seconds Download

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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_number,
    c.first_name,
    c.last_name,
    e.event_date,
    e.name AS event_name,
    ja.job_date,
    ja.status
FROM d_clients c
JOIN d_events e ON c.client_number = e.client_number
JOIN d_job_assignments ja ON e.id = ja.event_id;
```

Results Explain Describe Saved SQL History

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

1 rows returned in 0.01 seconds Download

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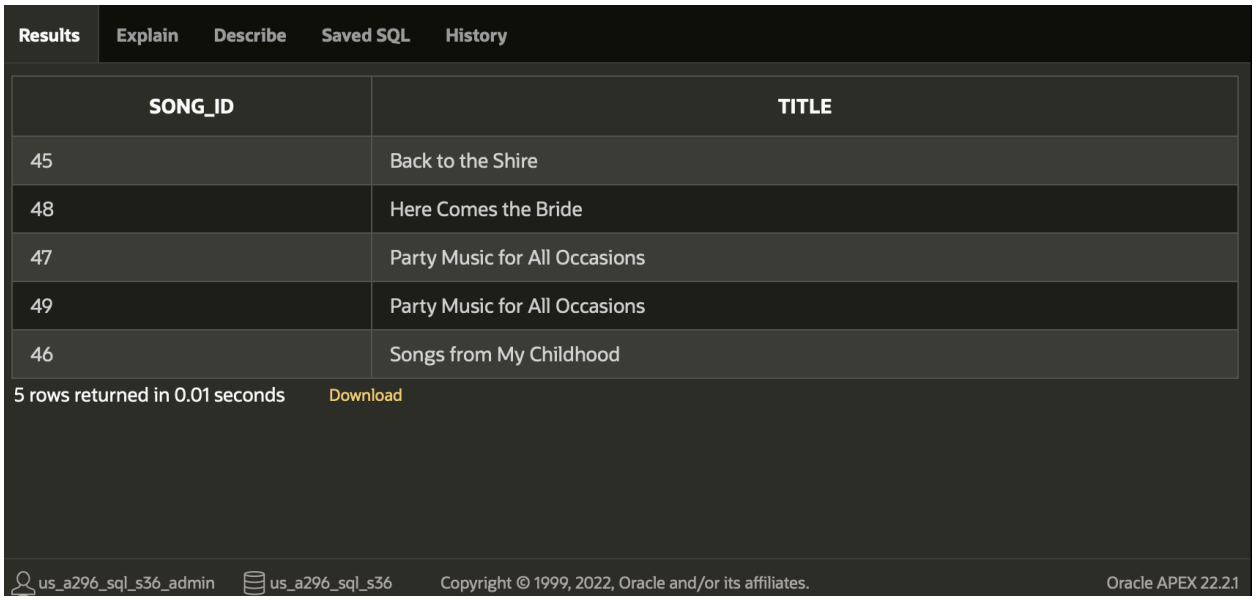
6. Create and execute an equijoin between DJs on Demand tables d_track_listings and d_cds. Return the song_id and the title only.

```
SELECT tl.song_id,
    c.title
FROM d_track_listings tl
JOIN d_cds c ON tl.cd_number = c.cd_number;
```



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.

___T_ 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.

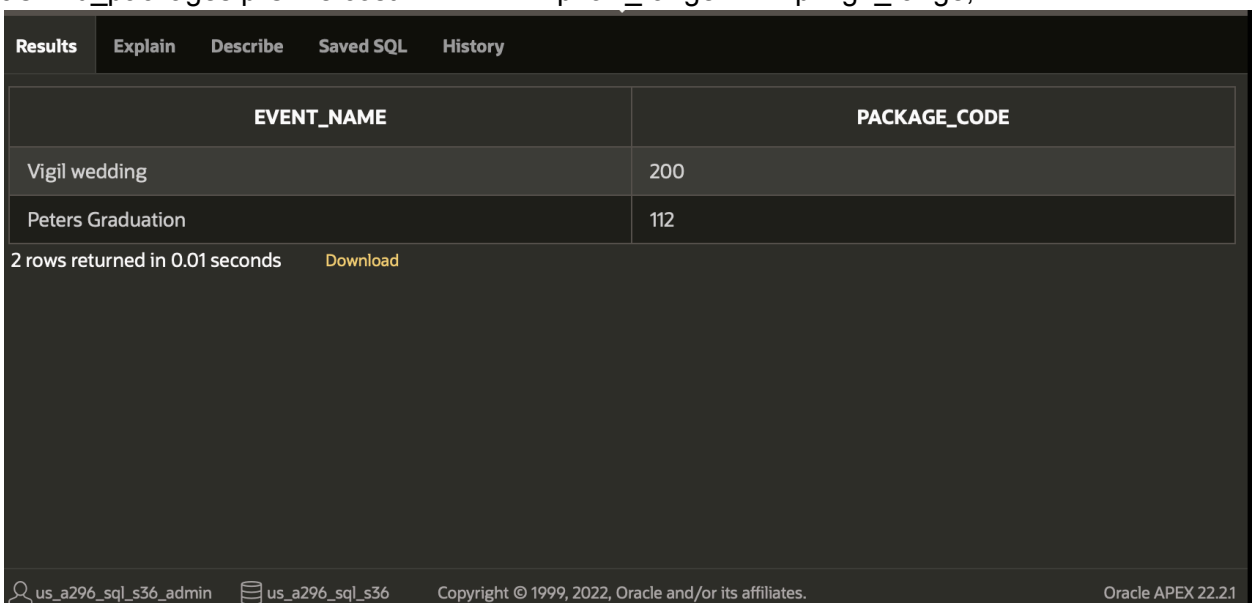
8. What advantage does being able to combine data from multiple tables have for a business?

Combining data from multiple tables allows businesses to gain comprehensive insights by correlating different datasets, facilitating informed decision-making, improving reporting accuracy, and enhancing data analysis capabilities.

7-2: Oracle Nonequijoins and Outer Joins

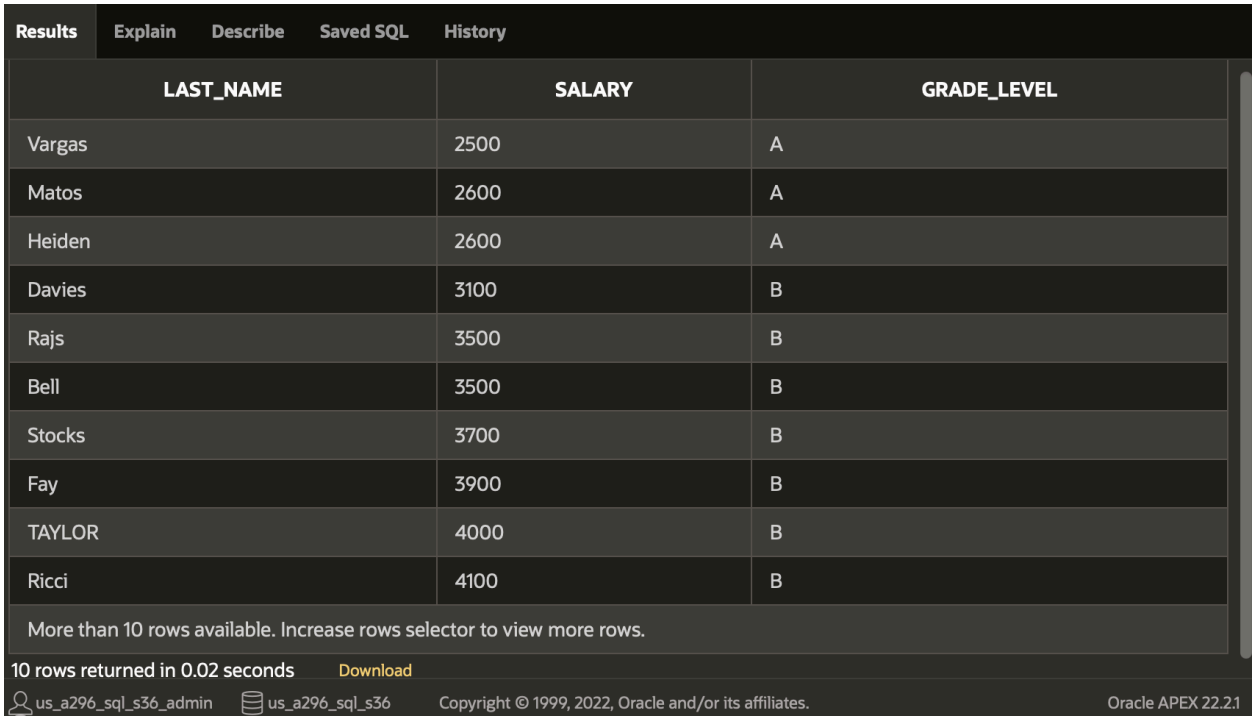
1. Create a join based on the cost of the event between the DJs on Demand tables D_EVENTS and D_PACKAGES. Show the name of the event and the code for each event.

```
SELECT e.name AS event_name,
    e.package_code
FROM d_events e
JOIN d_packages p ON e.cost BETWEEN p.low_range AND p.high_range;
```



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?

A nonequijoin is used when the join condition does not involve equality. You might use a nonequijoin to join rows where one value is between two others, or a range condition.

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?

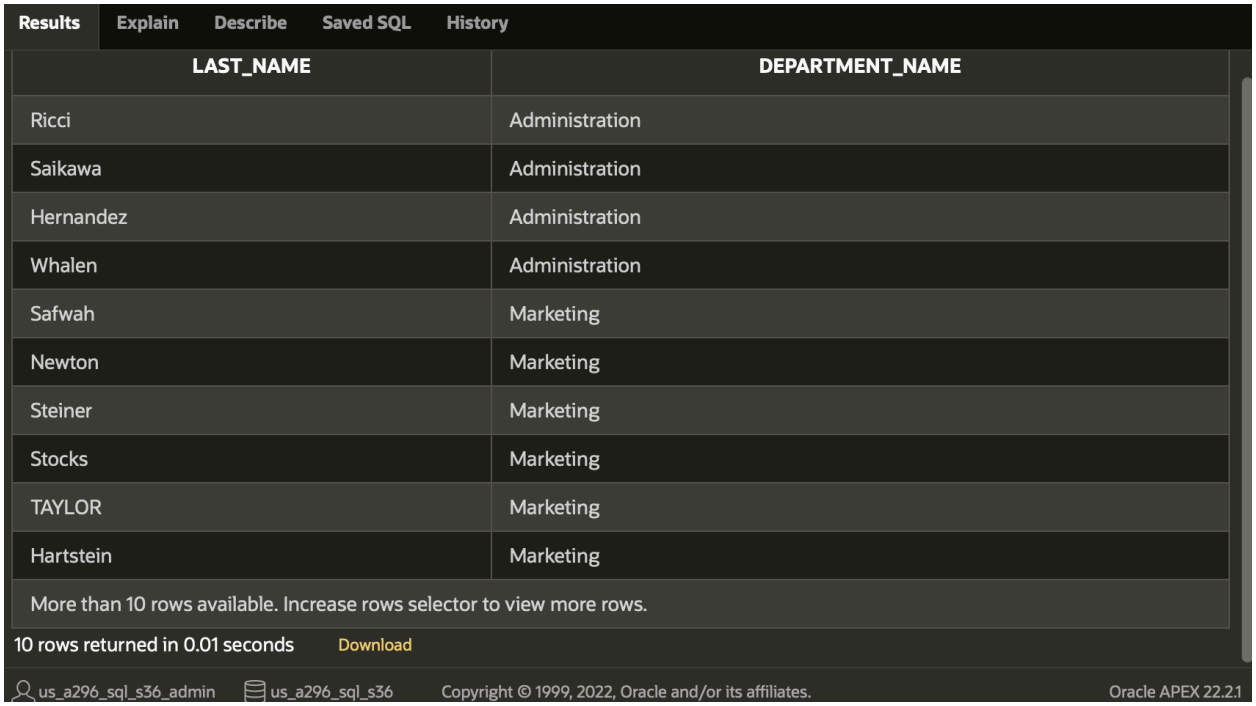
You should use a table alias when the table name is long or the query is complex, when there are multiple joins with tables that have the same column name and lastly, for better readability and to avoid ambiguity. When you wouldn't use a table alias is when the query is simple and involves only one table or when table names are clear and not ambiguous.

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

You would use a Nonequijoin.

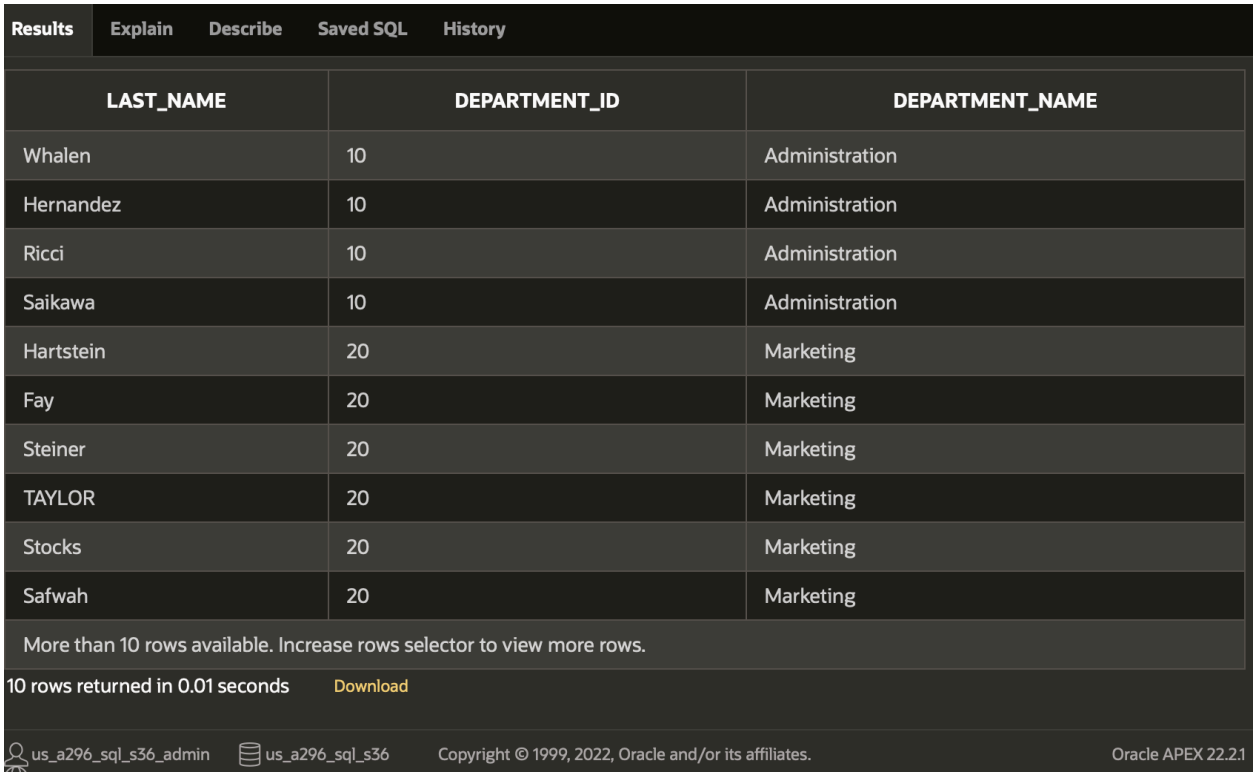
7. You need to produce a report for Global Fast Foods showing customers and orders. A customer must be included on the report even if the customer has had no orders.

```
SELECT e.last_name,
    d.department_name
FROM employees e
JOIN departments d ON e.department_id = d.department_id;
```



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;
```



Results | Explain | Describe | Saved SQL | History

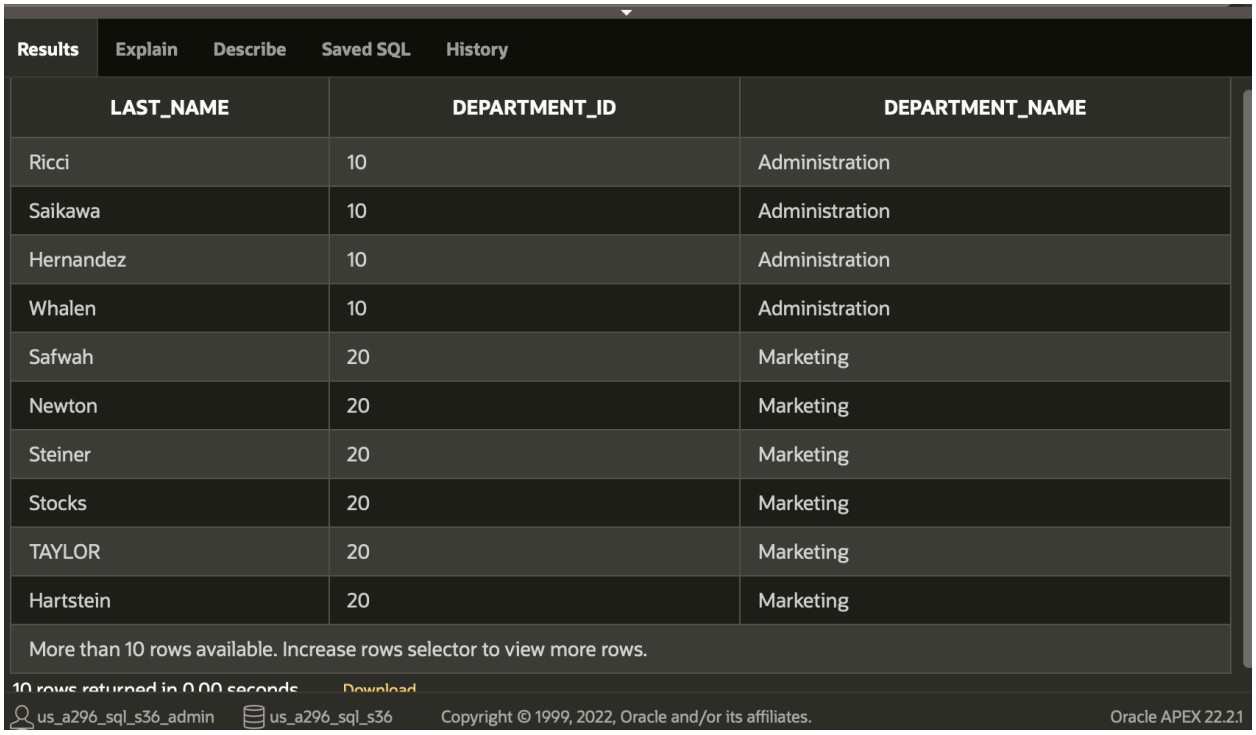
LAST_NAME	DEPARTMENT_ID	DEPARTMENT_NAME
Whalen	10	Administration
Hernandez	10	Administration
Ricci	10	Administration
Saikawa	10	Administration
Hartstein	20	Marketing
Fay	20	Marketing
Steiner	20	Marketing
TAYLOR	20	Marketing
Stocks	20	Marketing
Safwah	20	Marketing

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

10 rows returned in 0.01 seconds Download

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 (+);

The (+) should only be used with the Oracle-specific outer join syntax and cannot be used on both sides. It should appear only on the side where the "outer" join condition is specified.

WHERE e.department_id = d.department_id(+);

b. SELECT e.employee id, e. last name, d. location id

FROM employees, departments

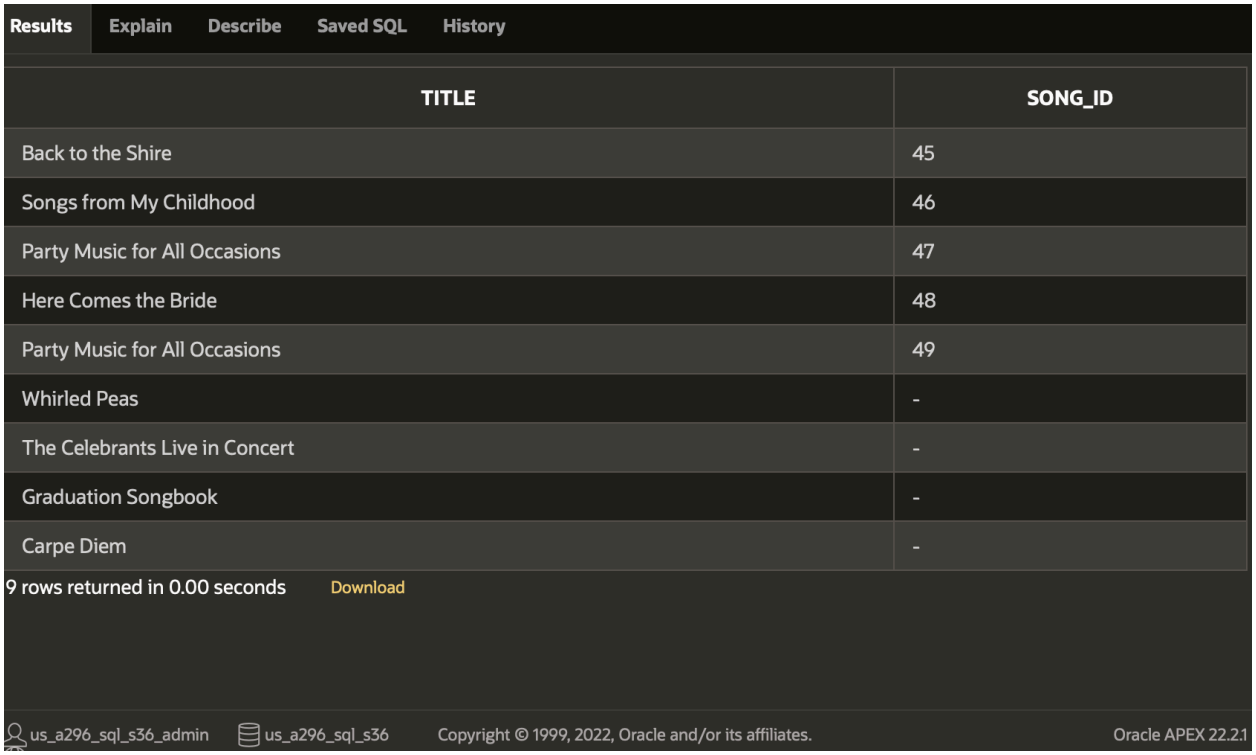
WHERE e.department_id = d.department_id(+);

The table aliases e and d are missing in the FROM clause and should be referenced properly in the SELECT statement.

```
SELECT e.employee_id,
    e.last_name,
    d.location_id
FROM employees e
LEFT JOIN departments d ON 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.title,
      t.song_id
FROM d_cds c
LEFT JOIN d_track_listings t ON c.cd_number = t.cd_number;
```



Results | Explain | Describe | Saved SQL | History

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
Whirled Peas	-
The Celebrants Live in Concert	-
Graduation Songbook	-
Carpe Diem	-

9 rows returned in 0.00 seconds Download

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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 imagine living on a farm, surrounded by animals and nature, where I can help both the animals and people at my own pace. In my role as a Farm Animal Caregiver and Wellness Coordinator, I would spend my days taking care of animals like horses, goats, chickens, and cows, making sure they are healthy, fed, and comfortable. At the same time, I’d create a peaceful space for people, allowing them to connect with the animals and learn about sustainable farming

practices. In addition to caring for the animals, I would offer wellness activities for people, like guided nature walks, animal therapy sessions, or farm experiences that promote relaxation and healing. I could even run workshops on animal care, natural healing, or farming techniques. This job would allow me to live at my own pace, enjoying the tranquility of farm life, while making a positive impact on both the animals and people I work with. It would combine my love for animals, nature, and helping others in a way that feels peaceful and fulfilling.

8-1: Group Functions

AVG	Calculates average value excluding nulls
COUNT	Returns the number of rows with non-null values for the expression
STDDEV	For two sets of data with approximately the same mean, the greater the spread, the greater the standard deviation
Group Functions	Operate on sets of rows to give one result per group
MIN	Returns minimum value ignoring nulls
STDDEV	Used with columns that store numeric data to calculate the spread of data around the mean
SUM	Calculates the sum ignoring null values
MAX	Returns the maximum value ignoring nulls
Aggregate	To gather into a sum or whole

1. Define and give an example of the seven group functions: AVG, COUNT, MAX, MIN, STDDEV, SUM, and VARIANCE.

AVG: Calculates the average of a set of values, excluding NULLs
SELECT AVG(salary) FROM employees;

COUNT: Returns the number of non-NULL values in a set.
SELECT COUNT(employee_id) FROM employees;

MAX: Returns the maximum value in a set.
SELECT MAX(salary) FROM employees;

MIN: Returns the minimum value in a set.
SELECT MIN(salary) FROM employees;

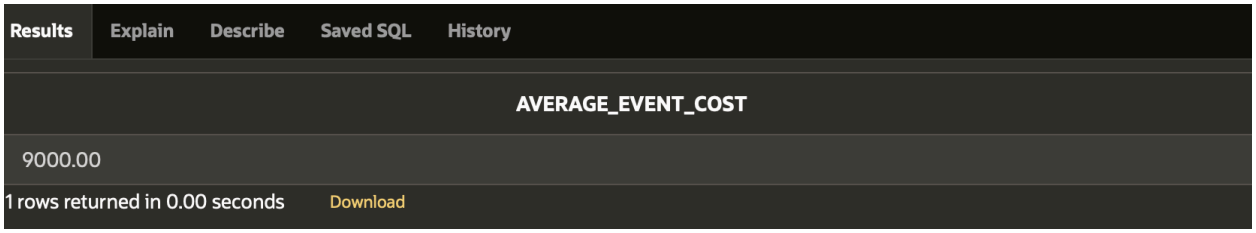
STDDEV: Calculates the standard deviation, a measure of the spread of a set of values.
SELECT STDDEV(salary) FROM employees;

SUM: Returns the total sum of values, excluding NULLs.
SELECT SUM(salary) FROM employees;

VARIANCE: Returns the variance, which is the square of the standard deviation.
SELECT VARIANCE(salary) FROM employees;

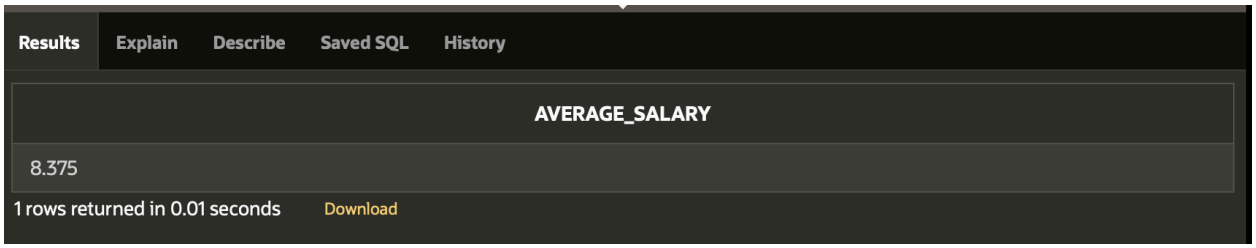
2. Create a query that will show the average cost of the DJs on Demand events. Round to two decimal places.

```
SELECT TO_CHAR(ROUND(AVG(cost), 2), 'FM9990.00') AS average_event_cost
FROM d_events;
```



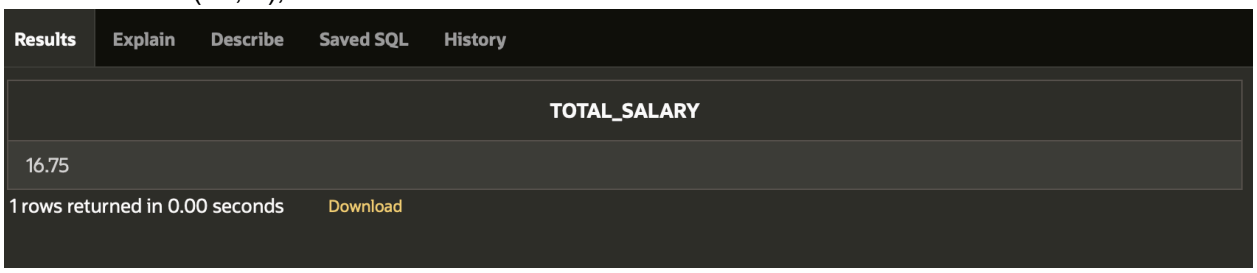
3. Find the average salary for Global Fast Foods staff members whose manager ID is 19.

```
SELECT AVG(salary) AS average_salary
FROM f_staffs
WHERE manager_id = 19;
```



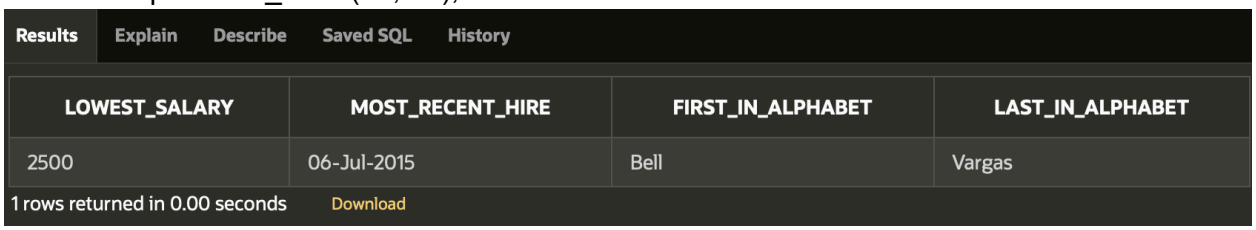
4. Find the sum of the salaries for Global Fast Foods staff members whose IDs are 12 and 9.

```
SELECT SUM(salary) AS total_salary
FROM f_staffs
WHERE 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,
    MIN(last_name) AS first_in_alphabet,
    MAX(last_name) AS last_in_alphabet
FROM employees
WHERE department_id IN (50, 60);
```



Results | Explain | Describe | Saved SQL | History

LOWEST_SALARY	MOST_RECENT_HIRE	FIRST_IN_ALPHABET	LAST_IN_ALPHABET
2500	06-Jul-2015	Bell	Vargas

1 rows returned in 0.00 seconds Download

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;
```

This query will return one row because the SUM function aggregates all values into a single result.

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 average salary report might have included employees who are paid hourly, and their hourly pay was being included as if it were salary. The query should filter out hourly employees.

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?

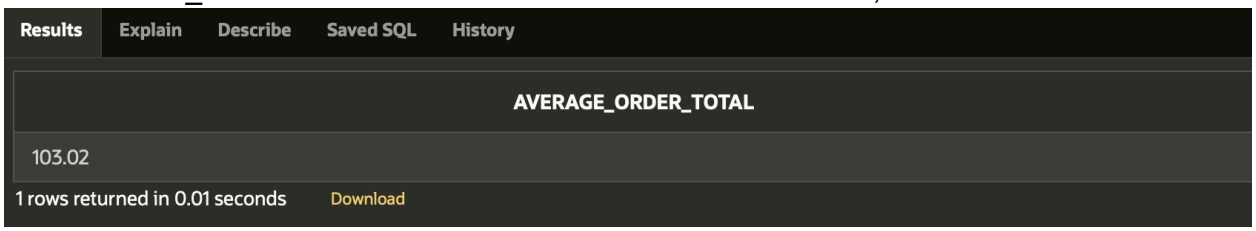
The earliest birthdate, March 30, 1969.

9. Create a query that will return the average order total for all Global Fast Foods orders from

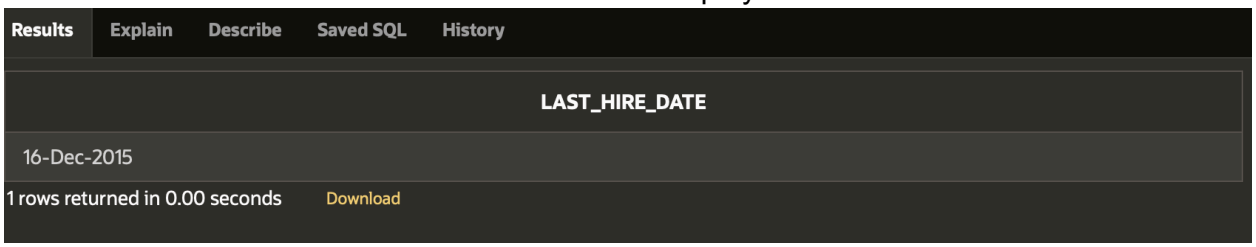
January 1, 2002, to December 21, 2002.

```
SELECT AVG(order_total) AS average_order_total
FROM f_orders
```

WHERE order_date BETWEEN '01-JAN-2002' AND '21-DEC-2002';



10. What was the hire date of the last Oracle employee hired?



11. In the following SELECT clause, which value returned by the SELECT statement will be larger?

SELECT SUM(operating_cost), AVG(operating_cost)

The SUM(operating_cost) will likely be larger because it calculates the total of all operating costs, while AVG(operating_cost) calculates the average, which is usually smaller than the total.

12. Refer to the DJs on Demand database D_EVENTS table:

Which code is valid as part of an SQL query?

_____a. FROM event_date

____x___b. SELECT SUM(cost)

_____c. SELECT SUM(event_date)

____x___d. SELECT AVG(cost) AS "Expense"

_____e. WHERE MIN(id) = 100

_____f. SELECT MAX(AVG(cost))

____x___g. SELECT MIN(event_date)

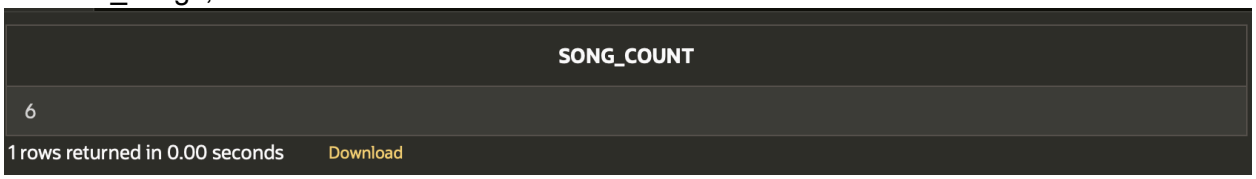
8-2: Count, Distinct, NVL

Vocabulary

COUNT	Returns the number of non-null values in the expression column
DISTINCT	The keyword used to return only non-duplicate values or combinations of non-duplicate values in a query
COUNT(DISTINCT)	Returns the number of unique non-null values in the expression column.

1. How many songs are listed in the DJs on Demand D_SONGS table?

```
SELECT COUNT(*) AS song_count
FROM d_songs;
```

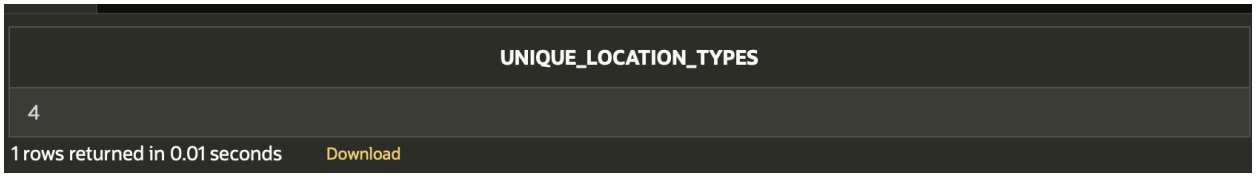


SONG_COUNT
6

1 rows returned in 0.00 seconds Download

2. In how many different location types has DJs on Demand had venues?

```
SELECT COUNT(DISTINCT loc_type) AS unique_location_types
FROM d_venues;
```



UNIQUE_LOCATION_TYPES
4

1 rows returned in 0.01 seconds Download

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) AS total_songs,
    COUNT(DISTINCT cd_number) AS distinct_cd_numbers
FROM d_track_listings;
```

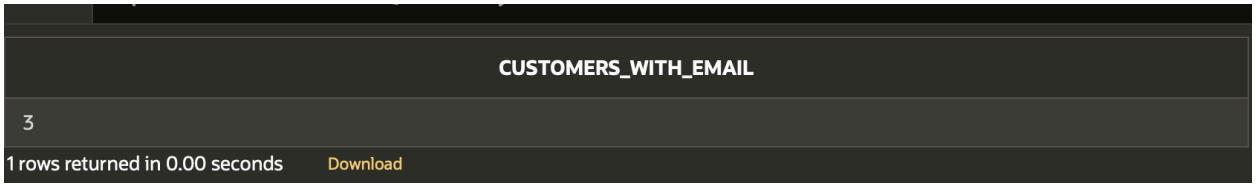
Results Explain Describe Saved SQL History

TOTAL_SONGS	DISTINCT_CD_NUMBERS
5	4

1 rows returned in 0.01 seconds Download

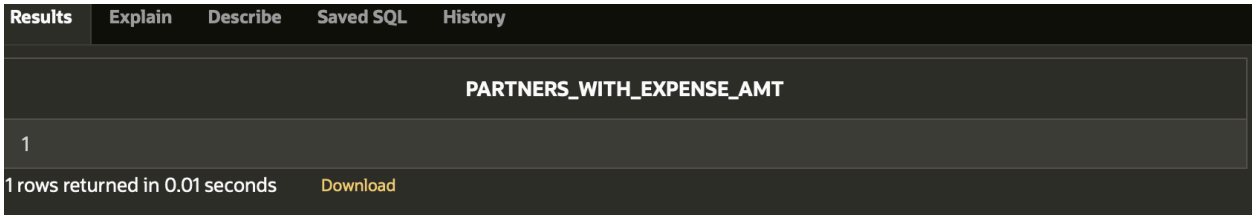
4. How many of the DJs on Demand customers have email addresses?

```
SELECT COUNT(email) AS customers_with_email
FROM d_clients
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(auth_expense_amt) AS partners_with_expense_amt
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

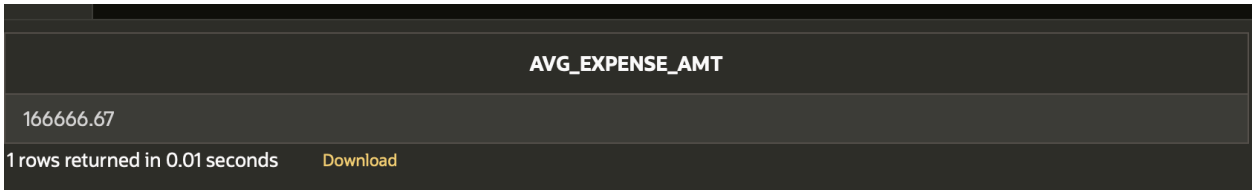
```
SELECT COUNT(shoe_color), COUNT(DISTINCT shoe_color)
```

COUNT(shoe_color) returns the total number of rows where shoe_color is not NULL (4).
COUNT(DISTINCT shoe_color) returns the number of unique non-null shoe colors (3).

```
FROM shoes;
```

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) AS avg_expense_amt
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.

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

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

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

statement.

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.

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

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

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