

**Universidad Nacional Autónoma  
de México**

## **Ejercicios Tema 7**

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**Bases de datos**

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**12/12 / 2022**

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### Consideraciones por investigar:

- En cada consulta, deberá mostrarse el tiempo que tomó en ejecutarse la consulta.

Para activar o desactivar el tiempo de Query, basta con ejecutar \timing en la terminal.

- Dentro del resultado de su consulta, deberá agregar una columna extra que incluya la fecha y hora del sistema y otra para el usuario que ejecuto la consulta.

Con la función NOW() podremos obtener fecha y hora del sistema, y con CURRENT\_USER obtenemos el usuario actual.

1. Indicar las ciudades que tienen mas de un aeropuerto. Agregar su notación correspondiente en álgebra relacional.

Código:

```
SELECT city, COUNT(airport), (SELECT NOW()), (SELECT CURRENT_USER)
FROM aeropuertos GROUP BY city HAVING COUNT(airport) > 1;
```

city	count	now	current_user
Jackson	2	2022-12-11 20:40:44.796851-06	postgres
Springfield	2	2022-12-11 20:40:44.796851-06	postgres
Albany	2	2022-12-11 20:40:44.796851-06	postgres
Columbia	2	2022-12-11 20:40:44.796851-06	postgres
New York	2	2022-12-11 20:40:44.796851-06	postgres
Jacksonville	2	2022-12-11 20:40:44.796851-06	postgres
Wilmington	2	2022-12-11 20:40:44.796851-06	postgres
San Diego	2	2022-12-11 20:40:44.796851-06	postgres
Chicago	2	2022-12-11 20:40:44.796851-06	postgres
Houston	2	2022-12-11 20:40:44.796851-06	postgres
Charleston	2	2022-12-11 20:40:44.796851-06	postgres
Portland	2	2022-12-11 20:40:44.796851-06	postgres
Columbus	2	2022-12-11 20:40:44.796851-06	postgres
Rochester	2	2022-12-11 20:40:44.796851-06	postgres
(14 filas)			

Duración: 1.548 ms

Álgebra relacional:

$\pi_{city; count(airport)} \rightarrow airport \text{ (aeropuertos)} \sigma_{count(airport) > 1}$

2. Nombre de las aerolíneas que no terminan en Inc. Ni en Co. Agregar su notación correspondiente en álgebra relacional.

Código:

```
SELECT airline,(SELECT NOW()),(SELECT CURRENT_USER) FROM
aerolineas WHERE airline NOT LIKE '%Inc.' AND airline NOT LIKE '%Co.';
```

airline	now	current_user
JetBlue Airways	2022-12-11 21:06:23.116013-06	postgres
Spirit Air Lines	2022-12-11 21:06:23.116013-06	postgres
Atlantic Southeast Airlines	2022-12-11 21:06:23.116013-06	postgres
Virgin America	2022-12-11 21:06:23.116013-06	postgres
(4 filas)		

Duración: 1.571 ms

Álgebra relacional:

$\sigma$  airline not like '%Inc.'  $\wedge$  airline not like '%Co.'(aerolineas)

3. Indicar los nombres de los aeropuertos que estuvieron implicados en el vuelo que presentó el mayor retraso de llegada.

Código:

```
SELECT AE.airport ,(SELECT NOW()), (SELECT CURRENT_USER) FROM
aeropuertos AE JOIN vuelos VU ON VU.origin_airport = AE.iata_code OR
VU.destination_airport = AE.iata_code WHERE VU.late_aircraft_delay =
(SELECT MAX(late_aircraft_delay) FROM vuelos);
```

airport	now	current_user
Dallas/Fort Worth International Airport	2022-12-11 22:20:11.018259-06	postgres
Honolulu International Airport	2022-12-11 22:20:11.018259-06	postgres
(2 filas)		

Duración: 5754.868 ms (00:05.755)

4. Mostrar aquella categoría (tabla artículo) que tiene el precio mínimo. La información debe estar agrupada (Implica que la consulta no sale con solo selects y wheres)

Código:

```
SELECT categoria, MIN(precio), (SELECT NOW()), (SELECT CURRENT_USER)
FROM articulo GROUP BY categoria HAVING MIN(precio) = (SELECT
MIN(precio) FROM articulo);
```

categoria	min	now	current_user
accesorios	120	2022-12-11 22:28:34.463531-06	postgres

(1 fila)

Duración: 1.838 ms

5. Se desea conocer el nombre de aquellas aerolíneas cuyo segundo carácter de iata\_code termina en X ó 9. Debe incluirse una columna que muestre dicha terminación.

Código:

```
SELECT airline, SUBSTR(iata_code,2) terminacion, (SELECT NOW()),
(SELECT CURRENT_USER) FROM aerolineas WHERE iata_code LIKE '_X' OR
iata_code LIKE '_9';
```

airline	terminacion	now	current_user
Frontier Airlines Inc.	9	2022-12-11 22:45:43.004008-06	postgres
Virgin America	X	2022-12-11 22:45:43.004008-06	postgres

(2 filas)

Duración: 1.851 ms

6. Proporcionar el nombre de los aeropuertos cuya latitud se encuentre entre 40 y 41 y su longitud sea menor que el promedio de la longitud. Nota: el promedio se toma de aquellas observaciones cuya latitud se encuentre entre 40 y 41.

Código:

```
SELECT airport, (SELECT NOW()), (SELECT CURRENT_USER) FROM
aeropuertos WHERE (latitude BETWEEN 40 AND 41) AND longitude <
(SELECT AVG(longitude) FROM aeropuertos WHERE latitude BETWEEN 40
AND 41);
```

airport	now	current_user
Arcata Airport	2022-12-11 22:58:31.886891-06	postgres
Elko Regional Airport	2022-12-11 22:58:31.886891-06	postgres
Central Nebraska Regional Airport	2022-12-11 22:58:31.886891-06	postgres
Yampa Valley Airportá(Yampa Valley Regional)	2022-12-11 22:58:31.886891-06	postgres
Lincoln Airportá(Lincoln Municipal)	2022-12-11 22:58:31.886891-06	postgres
Redding Municipal Airport	2022-12-11 22:58:31.886891-06	postgres
Salt Lake City International Airport	2022-12-11 22:58:31.886891-06	postgres
Valdez Airport	2022-12-11 22:58:31.886891-06	postgres
(8 filas)		

Duración: 1.181 ms



# 7. ¿Cuántos aviones por aerolínea y día, fueron cancelados saliendo del aeropuerto de Honolulu?

Código:

```
SELECT VU.airline, VU.day, COUNT(flight_number), (SELECT NOW()),(SELECT CURRENT_USER) FROM vuelos VU JOIN aeropuertos AE ON VU.origin_airport = AE.iata_code WHERE AE.City = 'Honolulu' AND VU.Cancelled IS NOT NULL GROUP BY airline, day;
```

airline	day	count	now	current_user	US	20	13	2022-12-11	23:36:52.072911-06	postgres
AA	1	80	2022-12-11 23:36:52.072911-06	postgres	US	21	14	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	2	78	2022-12-11 23:36:52.072911-06	postgres	US	22	15	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	3	78	2022-12-11 23:36:52.072911-06	postgres	US	23	14	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	4	81	2022-12-11 23:36:52.072911-06	postgres	US	24	14	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	5	79	2022-12-11 23:36:52.072911-06	postgres	US	25	15	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	6	77	2022-12-11 23:36:52.072911-06	postgres	US	26	15	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	7	78	2022-12-11 23:36:52.072911-06	postgres	US	27	14	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	8	78	2022-12-11 23:36:52.072911-06	postgres	US	28	14	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	9	75	2022-12-11 23:36:52.072911-06	postgres	US	29	13	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	10	76	2022-12-11 23:36:52.072911-06	postgres	US	30	12	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	11	78	2022-12-11 23:36:52.072911-06	postgres	US	31	7	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	12	77	2022-12-11 23:36:52.072911-06	postgres	VX	1	1	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	13	79	2022-12-11 23:36:52.072911-06	postgres	VX	2	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	14	78	2022-12-11 23:36:52.072911-06	postgres	VX	3	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	15	77	2022-12-11 23:36:52.072911-06	postgres	VX	4	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	16	77	2022-12-11 23:36:52.072911-06	postgres	VX	5	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	17	80	2022-12-11 23:36:52.072911-06	postgres	VX	6	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	18	79	2022-12-11 23:36:52.072911-06	postgres	VX	7	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	19	80	2022-12-11 23:36:52.072911-06	postgres	VX	8	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	20	82	2022-12-11 23:36:52.072911-06	postgres	VX	9	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	21	84	2022-12-11 23:36:52.072911-06	postgres	VX	10	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	22	82	2022-12-11 23:36:52.072911-06	postgres	VX	11	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	23	81	2022-12-11 23:36:52.072911-06	postgres	VX	12	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	24	78	2022-12-11 23:36:52.072911-06	postgres	VX	13	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	25	79	2022-12-11 23:36:52.072911-06	postgres	VX	14	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	26	80	2022-12-11 23:36:52.072911-06	postgres	VX	15	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	27	83	2022-12-11 23:36:52.072911-06	postgres	VX	16	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	28	84	2022-12-11 23:36:52.072911-06	postgres	VX	17	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	29	76	2022-12-11 23:36:52.072911-06	postgres	VX	18	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	30	75	2022-12-11 23:36:52.072911-06	postgres	VX	19	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AA	31	45	2022-12-11 23:36:52.072911-06	postgres	VX	20	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	1	76	2022-12-11 23:36:52.072911-06	postgres	VX	21	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	2	77	2022-12-11 23:36:52.072911-06	postgres	VX	22	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	3	75	2022-12-11 23:36:52.072911-06	postgres	VX	23	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	4	77	2022-12-11 23:36:52.072911-06	postgres	VX	24	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	5	75	2022-12-11 23:36:52.072911-06	postgres	VX	25	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	6	77	2022-12-11 23:36:52.072911-06	postgres	VX	26	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	7	75	2022-12-11 23:36:52.072911-06	postgres	VX	27	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	8	77	2022-12-11 23:36:52.072911-06	postgres	VX	28	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	9	78	2022-12-11 23:36:52.072911-06	postgres	VX	29	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS	10	73	2022-12-11 23:36:52.072911-06	postgres	VX	30	2	2022-12-11 23:36:52.072911-06	postgres	postgres
AS					VX	31	1	2022-12-11 23:36:52.072911-06	postgres	postgres

Duración: 4589.128 ms (00:04.589)

8. Hacer un cross join entre la tabla cliente y la tabla aerolíneas. Obviamente ambas tablas forman parte de distintas BDs, debe encontrar la forma de hacerlo.

Para poder realizar un cruce de tablas entre dos bases de datos es necesario tener instalado dblink en postgres, desde postgresql 9.1 la instalación es mas simple ya que deberemos crear una extensión con la siguiente sintaxis:

**CREATE EXTENSION dblink;**

Una vez creada la extension podremos hacer uso de ella.

Código:

```
SELECT *, (SELECT NOW()), (SELECT CURRENT_USER)FROM cliente CROSS
JOIN dblink('dbname = registro_vuelos port = 5432 host = localhost user =
postgres password = admin','SELECT * FROM aerolineas') AS s(iata_code
character varying, airline character varying);
```

id_cliente	iata_code	nombre	now	current_user	ap_pat	ap_mat	e
aksvieoci125	Luisa	Balderas					
dmx	UA	United Air Lines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
abcd		mario					
dmx	UA	United Air Lines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
ejemplo	Jaime	Cruz			flores		n
ayarit	UA	United Air Lines Inc.	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci144	Angela	Perez					
ayarit	UA	United Air Lines Inc.	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci126	Luis	Lopez					
dmx	UA	United Air Lines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci127	Luis	Valderrama					
dmx	UA	United Air Lines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci137	Luis	Valderrama					
dmx	UA	United Air Lines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci125	Luisa	Balderas					
dmx	AA	American Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
abcd		mario					
dmx	AA	American Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
ejemplo	Jaime	Cruz			flores		n
ayarit	AA	American Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci144	Angela	Perez					
ayarit	AA	American Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci126	Luis	Lopez					
dmx	AA	American Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci127	Luis	Valderrama					
dmx	AA	American Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci137	Luis	Valderrama					
dmx	AA	American Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci125	Luisa	Balderas					
dmx	US	US Airways Inc.	2022-12-12 00:24:16.490114-06	postgres			c
abcd		mario					
dmx	US	US Airways Inc.	2022-12-12 00:24:16.490114-06	postgres			c
ejemplo	Jaime	Cruz			flores		n
ayarit	US	US Airways Inc.	2022-12-12 00:24:16.490114-06	postgres			n
ayarit	HA	Hawaiian Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci126	Luis	Lopez					
dmx	HA	Hawaiian Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci127	Luis	Valderrama					
dmx	HA	Hawaiian Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci137	Luis	Valderrama					
dmx	HA	Hawaiian Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci125	Luisa	Balderas					
dmx	MQ	American Eagle Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
abcd		mario					
dmx	MQ	American Eagle Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
ejemplo	Jaime	Cruz			flores		n
ayarit	MQ	American Eagle Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci144	Angela	Perez					
ayarit	MQ	American Eagle Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci126	Luis	Lopez					
dmx	MQ	American Eagle Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci127	Luis	Valderrama					
dmx	MQ	American Eagle Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci137	Luis	Valderrama					
dmx	MQ	American Eagle Airlines Inc.	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci125	Luisa	Balderas					
dmx	VX	Virgin America	2022-12-12 00:24:16.490114-06	postgres			c
abcd		mario					
dmx	VX	Virgin America	2022-12-12 00:24:16.490114-06	postgres			c
ejemplo	Jaime	Cruz			flores		n
ayarit	VX	Virgin America	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci144	Angela	Perez					
ayarit	VX	Virgin America	2022-12-12 00:24:16.490114-06	postgres			n
aksvieoci126	Luis	Lopez					
dmx	VX	Virgin America	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci127	Luis	Valderrama					
dmx	VX	Virgin America	2022-12-12 00:24:16.490114-06	postgres			c
aksvieoci137	Luis	Valderrama					
dmx	VX	Virgin America	2022-12-12 00:24:16.490114-06	postgres			c
(98 filas)							

Duración: 119.296 ms

## 9. Cantidad de vuelos cancelados por día.

Código:

```
SELECT day, COUNT(flight_number), (SELECT NOW()),(SELECT  
CURRENT_USER) FROM vuelos WHERE Cancelled IS NOT NULL GROUP BY  
day;
```

day	count	now		current_user
1	189477	2022-12-11	23:49:52.862814-06	postgres
2	195986	2022-12-11	23:49:52.862814-06	postgres
3	190007	2022-12-11	23:49:52.862814-06	postgres
4	190893	2022-12-11	23:49:52.862814-06	postgres
5	189766	2022-12-11	23:49:52.862814-06	postgres
6	191232	2022-12-11	23:49:52.862814-06	postgres
7	187598	2022-12-11	23:49:52.862814-06	postgres
8	193964	2022-12-11	23:49:52.862814-06	postgres
9	194224	2022-12-11	23:49:52.862814-06	postgres
10	189288	2022-12-11	23:49:52.862814-06	postgres
11	190756	2022-12-11	23:49:52.862814-06	postgres
12	190872	2022-12-11	23:49:52.862814-06	postgres
13	195089	2022-12-11	23:49:52.862814-06	postgres
14	188611	2022-12-11	23:49:52.862814-06	postgres
15	192950	2022-12-11	23:49:52.862814-06	postgres
16	195899	2022-12-11	23:49:52.862814-06	postgres
17	191319	2022-12-11	23:49:52.862814-06	postgres
18	191393	2022-12-11	23:49:52.862814-06	postgres
19	193284	2022-12-11	23:49:52.862814-06	postgres
20	195707	2022-12-11	23:49:52.862814-06	postgres
21	189413	2022-12-11	23:49:52.862814-06	postgres
22	192725	2022-12-11	23:49:52.862814-06	postgres
23	193560	2022-12-11	23:49:52.862814-06	postgres
24	185017	2022-12-11	23:49:52.862814-06	postgres
25	187317	2022-12-11	23:49:52.862814-06	postgres
26	187387	2022-12-11	23:49:52.862814-06	postgres
27	191920	2022-12-11	23:49:52.862814-06	postgres
28	191401	2022-12-11	23:49:52.862814-06	postgres
29	179441	2022-12-11	23:49:52.862814-06	postgres
30	178771	2022-12-11	23:49:52.862814-06	postgres
31	103812	2022-12-11	23:49:52.862814-06	postgres

(31 filas)

Duración: 3989.921 ms (00:03.990)



10. Seleccionar el nombre de los aeropuertos cuya segunda letra de iata\_code sea K ó X, sin usar operadores and, not u or. Puede usar alguna función propia de postgres.

Código:

```
SELECT airport, (SELECT NOW()), (SELECT CURRENT_USER) FROM
aeropuertos WHERE SUBSTRING(iata_code,2,1) IN ('K','X');
```

airport	now	current_user
King Salmon Airport	2022-12-12 14:32:42.258739-06	postgres
Elko Regional Airport	2022-12-12 14:32:42.258739-06	postgres
General Mitchell International Airport	2022-12-12 14:32:42.258739-06	postgres
Muskegon County Airport	2022-12-12 14:32:42.258739-06	postgres
Will Rogers World Airport	2022-12-12 14:32:42.258739-06	postgres
Rock Springs-Sweetwater County Airport	2022-12-12 14:32:42.258739-06	postgres
Texarkana Regional Airportá(Webb Field)	2022-12-12 14:32:42.258739-06	postgres

(7 filas)

Duración: 0.970 ms

11. Indicar el nombre(s) de la aerolínea cuya distancia de vuelo es la mayor.

Código:

```
SELECT DISTINCT AE.airline, (SELECT NOW()), (SELECT CURRENT_USER)
FROM vuelos VU JOIN aerolineas AE ON VU.airline = AE.iata_code WHERE
distance = (SELECT MAX(distance) FROM vuelos);
```

airline	now	current_user
Delta Air Lines Inc.	2022-12-11 23:59:37.028874-06	postgres
Hawaiian Airlines Inc.	2022-12-11 23:59:37.028874-06	postgres

(2 filas)

Duración: 4761.172 ms (00:04.761)

12. Indicar el nombre del aeropuerto de origen donde se presentó el mayor tiempo de vuelo.

Código:

```
SELECT DISTINCT AE.airport, (SELECT NOW()), (SELECT CURRENT_USER)
FROM aeropuertos AE JOIN vuelos VU ON VU.origin_airport = AE.iata_code
WHERE VU.air_time = (SELECT MAX(air_time) FROM vuelos);
```

airport	now	current_user
John F. Kennedy International Airportá(New York International Airport)	2022-12-12 00:05:08.088879-06	postgres

(1 fila)

Duración: 4627.703 ms (00:04.628)