Universidad de Costa Rica
Escuela de Ciencias de la Computación e Informática
Bases de Datos Avanzadas PF-3861

Practica aplicada #3
Bases de datos distribuidas

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Profesor:
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II Ciclo 2020

Resultados:

Primera Parte - Configuración del Ambiente Base para parte 2

1. Se utiliza la cuenta de Oracle Cloud Academy para crear una máquina virtual denominada oracle_xe con la imagen de Oracle Linux y se procede a instalar la base de datos Oracle XE 18c:

Create instance

Name	State	Public IP	Private IP	Shape	OCPU count	Memory (GB)	Availability domain	Fault domain	Created
oracle_xe	Running	140.238.178.191	10.0.2.173	VM.Standard.E3.Flex	2	8	AD-1	FD-2	Wed, Nov 10, 2021, 02:45:51 UTC
oci-oraclelinuxdb1	Stopped	140.238.238.217	10.0.2.150	VM.Optimized3.Flex	2	4	AD-1	FD-3	Tue, Nov 9, 2021, 01:05:36 UTC

Showing 2 Items 1 of 1

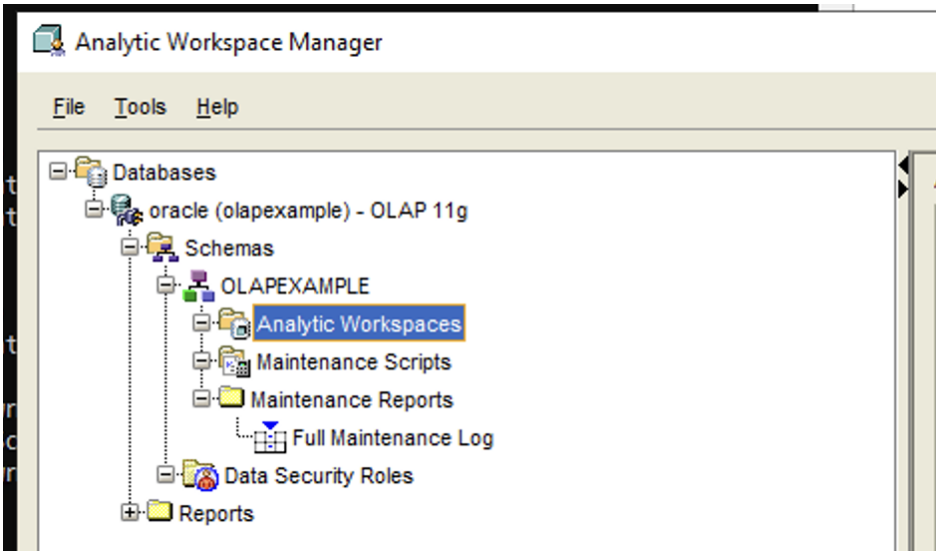
2. Confirmamos que Oracle XE está corriendo:

```
gabriel@Gabriels-MacBook-Air [PF-3861] > ssh -i ~/.ssh/id_rsa opc@140.238.178.191
[opc@oracle-xe ~]$ sqlplus sys/Practica3 as sysdba

SQL*Plus: Release 18.0.0.0.0 - Production on Wed Nov 10 03:53:45 2021 Version 18.4.0.0.0

Copyright (c) 1982, 2018, Oracle.  All rights reserved.

Connected to:
Oracle Database 18c Express Edition Release 18.0.0.0.0 - Production Version 18.4.0.0.0
```

3. Abrimos el puerto 1521 en el firewall:

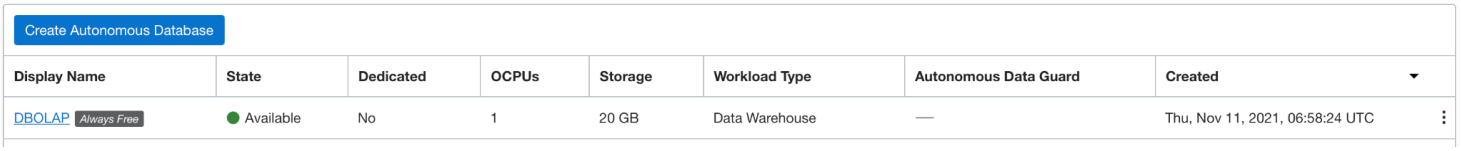
```
[opc@oracle-xe ~]$ sudo firewall-cmd --zone=public --add-port=1521/tcp
success
```

4. Por último utilizando el programa Oracle Analytic Workspace, corriendo en una máquina virtual Windows, para conectarnos a la base de datos con el usuario "olapexample":

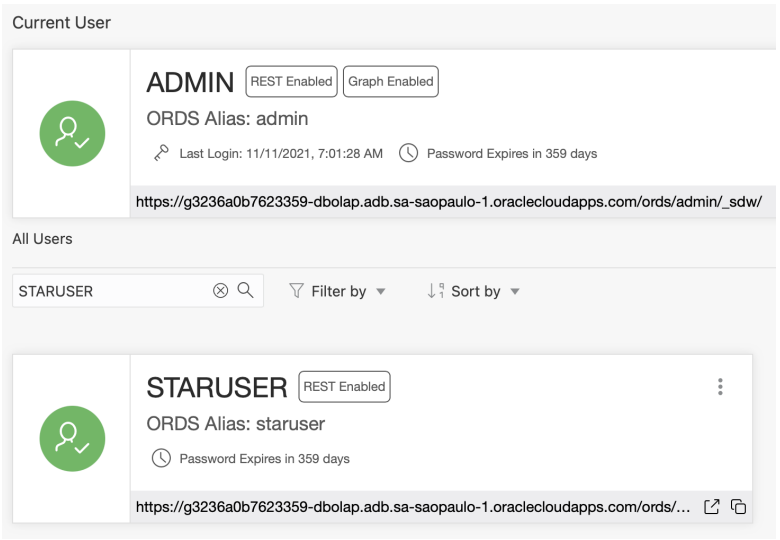


Primera Parte - Configuración del Ambiente Base para parte 3

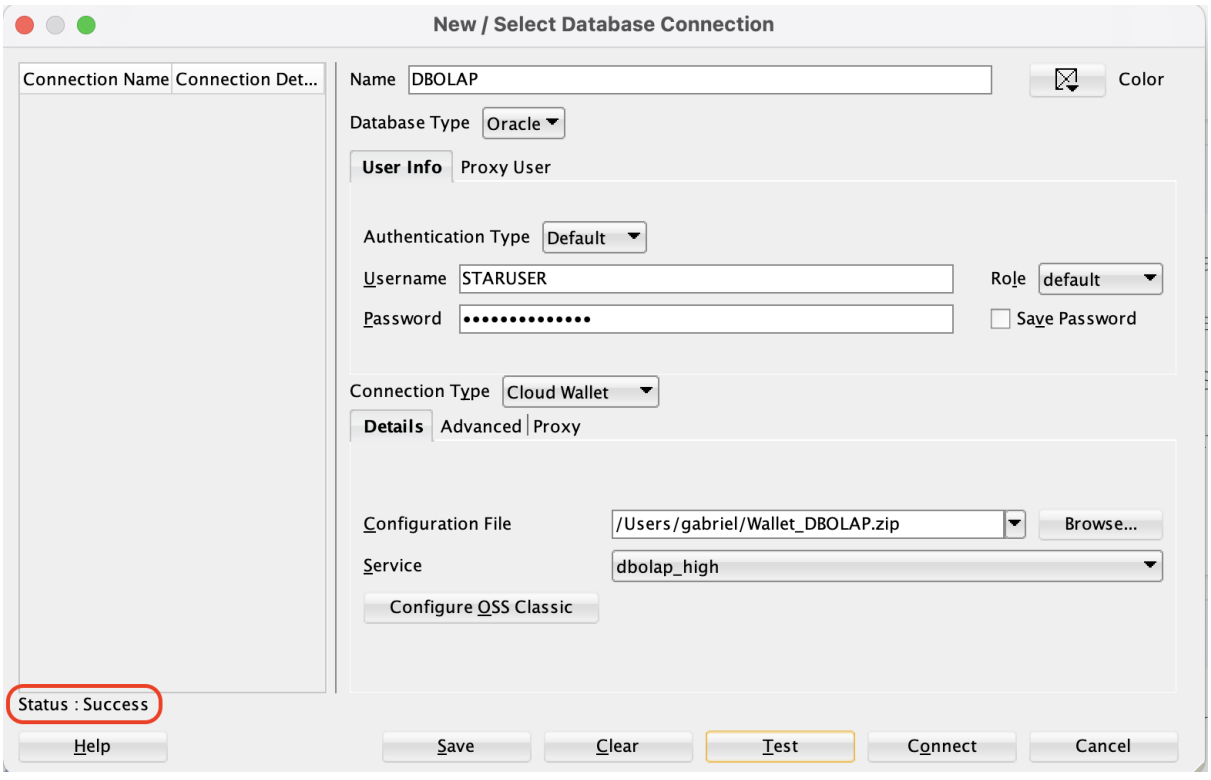
1. Se utiliza la cuenta de Oracle Cloud Academy para crear un autonomous database denominada DBOLAP:



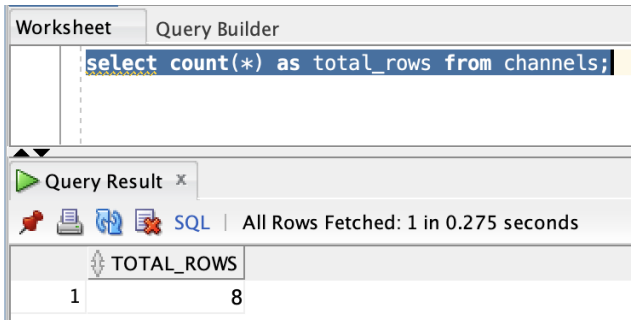
2. Una vez que la base de datos se encuentra provisionada, se crea un nuevo usuario llamado STARUSER:

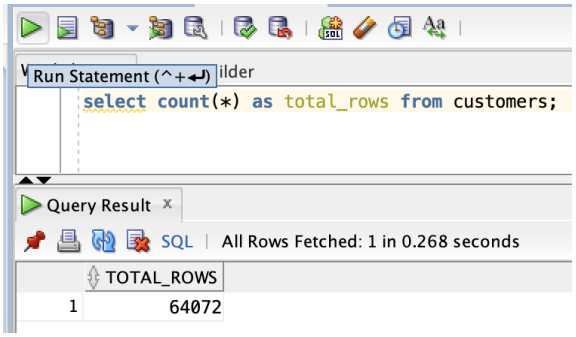


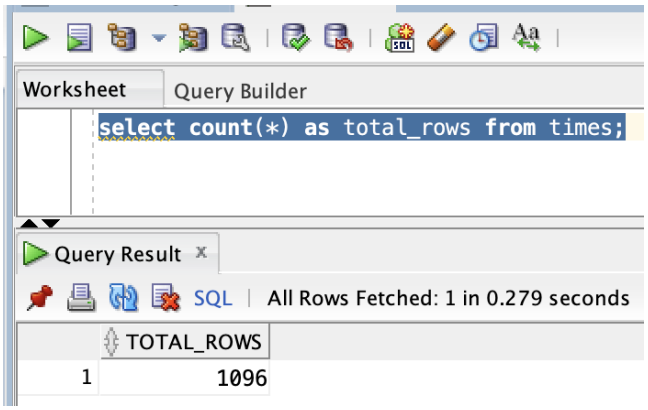
3. El siguiente paso es conectarse a la base de datos con el usuario STARUSER, mediante SQL Developer, usando el cloud wallet. Probamos que este funcione correctamente mediante el botón “Test”:

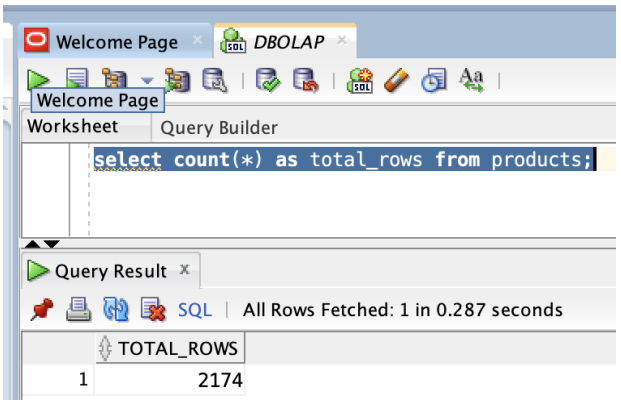


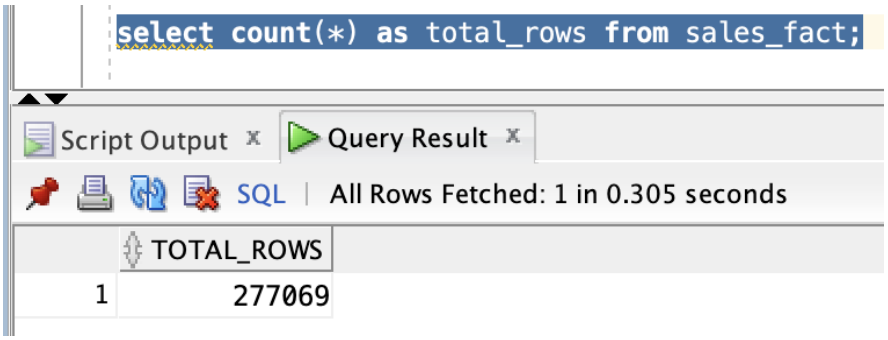
4. Por último, se cargan todos los datos a la base de datos DBOLAP:





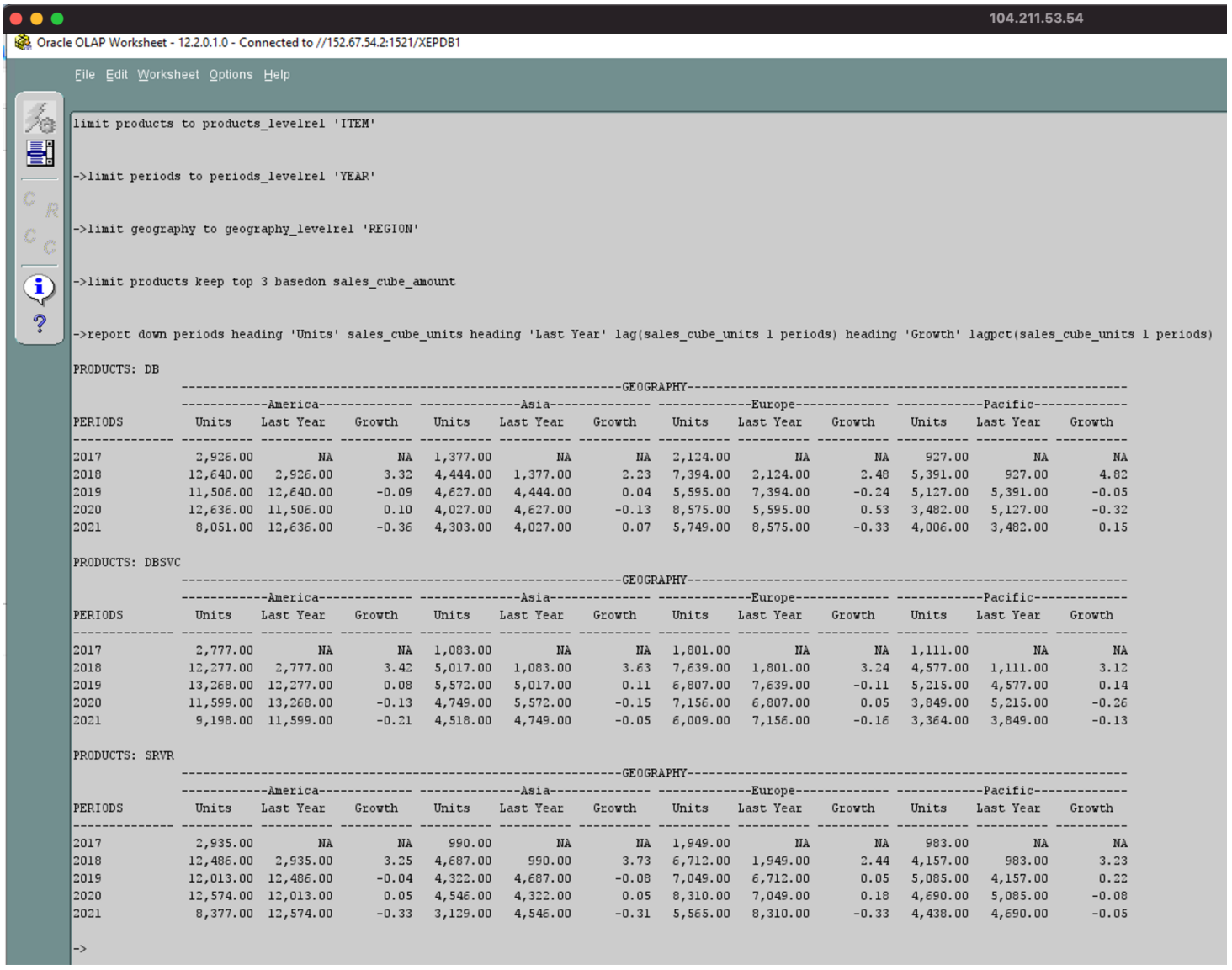






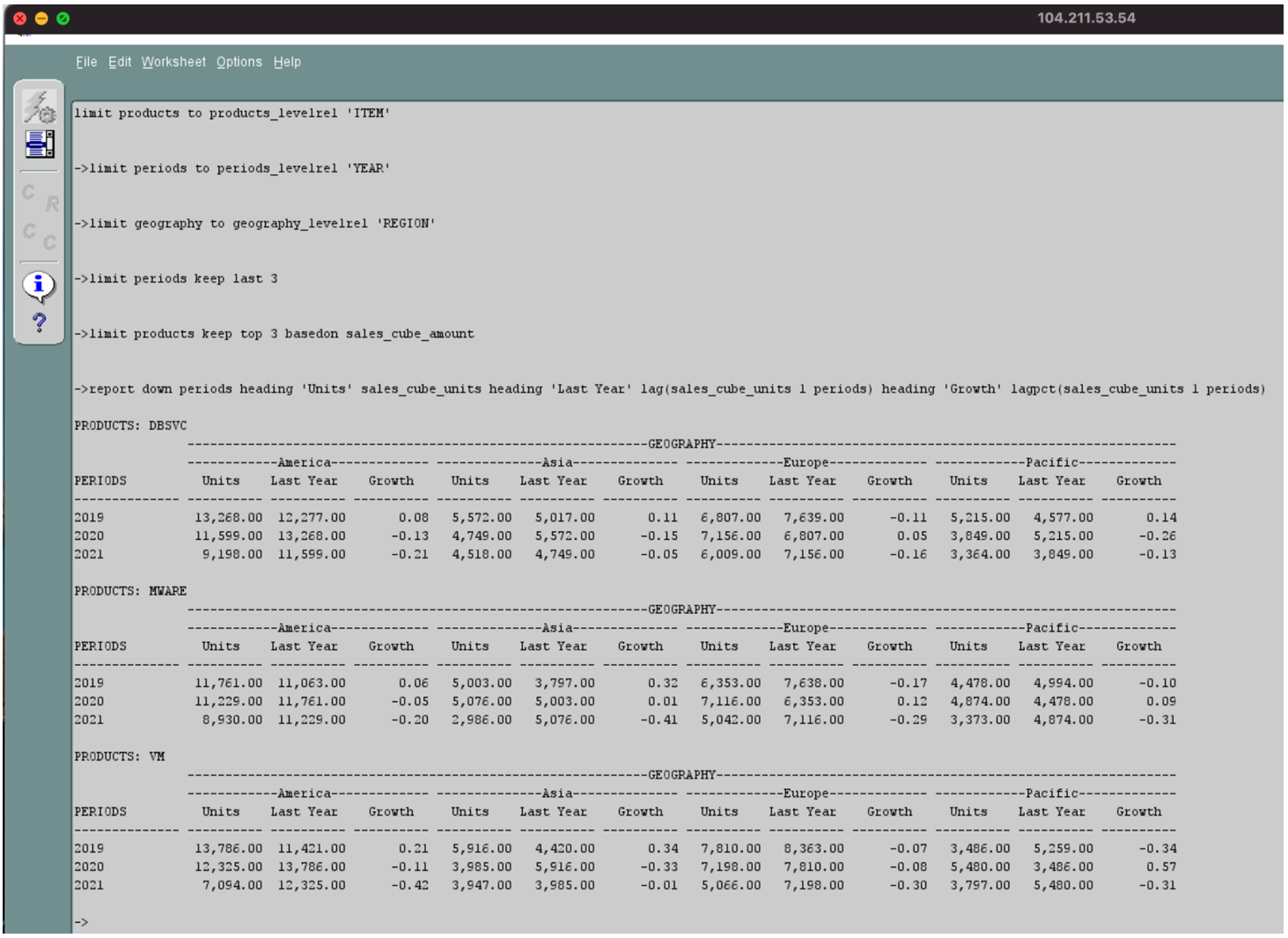
Segunda Parte - Resultados de configuración de cubo OLAP

1. Mediante Oracle Analytic Workspace Manager, se crea un cubo OLAP y se cargan los datos necesarios para hacer que este funcione.
2. Una vez que se han creado los objetos y cargado los datos al cubo, se usa el OLAP Worksheet para producir un reporte que cumpla los siguientes objetivos:
    a. Obtenga los 3 productos a nivel de ITEM con mayores ventas considerando AMOUNT, y reporte a nivel de region y a nivel de año las unidades vendidas en año anterior y su porcentaje de crecimiento:




```
limit products to products_levelrel 'ITEM';
limit periods to periods_levelrel 'YEAR';
limit geography to geography_levelrel 'REGION';
limit products keep top 3 basedon sales_cube_amount;
report down periods heading 'Units' sales_cube_units heading 'Last Year'
lag(sales_cube_units 1 periods) heading 'Growth' lagpct(sales_cube_units 1 periods);
```

b. Modifique el reporte anterior para que solamente se muestren los 3 últimos años:



```
104.211.53.54

File  Edit  Worksheet  Options  Help

limit products to products_levelrel 'ITEM'

->limit periods to periods_levelrel 'YEAR'

->limit geography to geography_levelrel 'REGION'

->limit periods keep last 3

->limit products keep top 3 basedon sales_cube_amount

->report down periods heading 'Units' sales_cube_units heading 'Last Year' lag(sales_cube_units 1 periods) heading 'Growth' lagpct(sales_cube_units 1 periods)

PRODUCTS: DBSVC
                                                                    ----------GEOGRAPHY----------
                ----------America---------- ----------Asia---------- ----------Europe---------- ----------Pacific----------
PERIODS           Units    Last Year    Growth     Units    Last Year    Growth     Units    Last Year    Growth     Units    Last Year    Growth
--------------- --------- --------- --------- --------- --------- --------- --------- --------- --------- --------- --------- ---------
2019            13,268.00 12,277.00      0.08  5,572.00  5,017.00      0.11  6,807.00  7,639.00     -0.11  5,215.00  4,577.00      0.14
2020            11,599.00 13,268.00     -0.13  4,749.00  5,572.00     -0.15  7,156.00  6,807.00      0.05  3,849.00  5,215.00     -0.26
2021             9,198.00 11,599.00     -0.21  4,518.00  4,749.00     -0.05  6,009.00  7,156.00     -0.16  3,364.00  3,849.00     -0.13

PRODUCTS: MWARE
                                                                    ----------GEOGRAPHY----------
                ----------America---------- ----------Asia---------- ----------Europe---------- ----------Pacific----------
PERIODS           Units    Last Year    Growth     Units    Last Year    Growth     Units    Last Year    Growth     Units    Last Year    Growth
--------------- --------- --------- --------- --------- --------- --------- --------- --------- --------- --------- --------- ---------
2019            11,761.00 11,063.00      0.06  5,003.00  3,797.00      0.32  6,353.00  7,638.00     -0.17  4,478.00  4,994.00     -0.10
2020            11,229.00 11,761.00     -0.05  5,076.00  5,003.00      0.01  7,116.00  6,353.00      0.12  4,874.00  4,478.00      0.09
2021             8,930.00 11,229.00     -0.20  2,986.00  5,076.00     -0.41  5,042.00  7,116.00     -0.29  3,373.00  4,874.00     -0.31

PRODUCTS: VM
                                                                    ----------GEOGRAPHY----------
                ----------America---------- ----------Asia---------- ----------Europe---------- ----------Pacific----------
PERIODS           Units    Last Year    Growth     Units    Last Year    Growth     Units    Last Year    Growth     Units    Last Year    Growth
--------------- --------- --------- --------- --------- --------- --------- --------- --------- --------- --------- --------- ---------
2019            13,786.00 11,421.00      0.21  5,916.00  4,420.00      0.34  7,810.00  8,363.00     -0.07  3,486.00  5,259.00     -0.34
2020            12,325.00 13,786.00     -0.11  3,985.00  5,916.00     -0.33  7,198.00  7,810.00     -0.08  5,480.00  3,486.00      0.57
2021             7,094.00 12,325.00     -0.42  3,947.00  3,985.00     -0.01  5,066.00  7,198.00     -0.30  3,797.00  5,480.00     -0.31

->
```

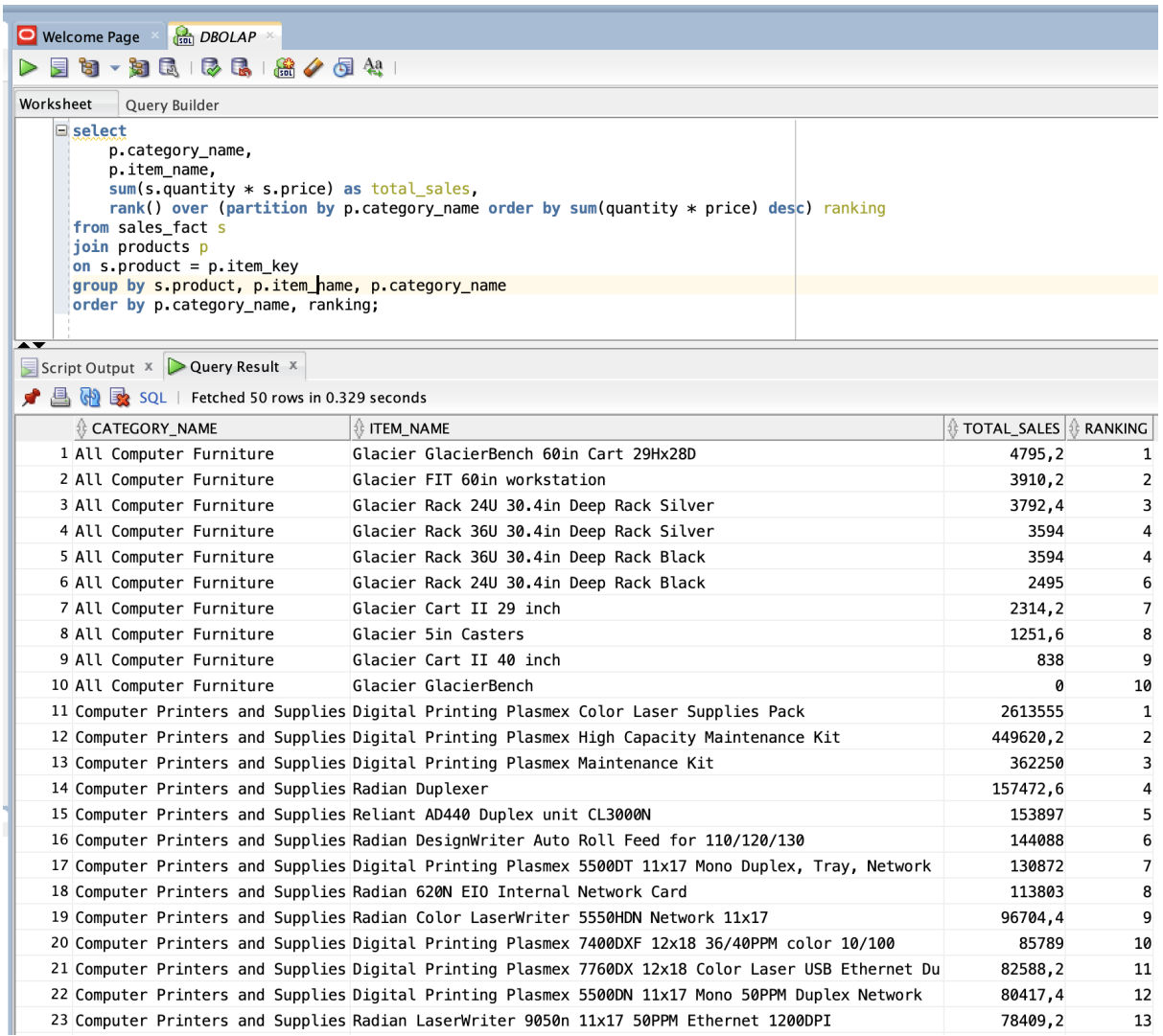
```
limit products to products_levelrel 'ITEM';
limit periods to periods_levelrel 'YEAR';
limit geography to geography_levelrel 'REGION';
limit periods keep last 3;
limit products keep top 3 basedon sales_cube_amount;
report down periods heading 'Units' sales_cube_units heading 'Last Year'
lag(sales_cube_units 1 periods) heading 'Growth' lagpct(sales_cube_units 1
periods)
```

Tercera Parte - Resultados de ejecución de consultas analíticas en star schema

Utilizando la base de datos DBOLAP y el usuario STARUSER, utilice SQL Analytics para responder a las siguientes preguntas.

1. Obtenga el ranking de cada producto dentro de su categoría de acuerdo a las ventas totales (de mayor a menor), considerando todos los años. Las ventas = QUANTITY * PRICE. Ordene el resultado por categoría y ranking. Su reporte debería verse más o menos así:

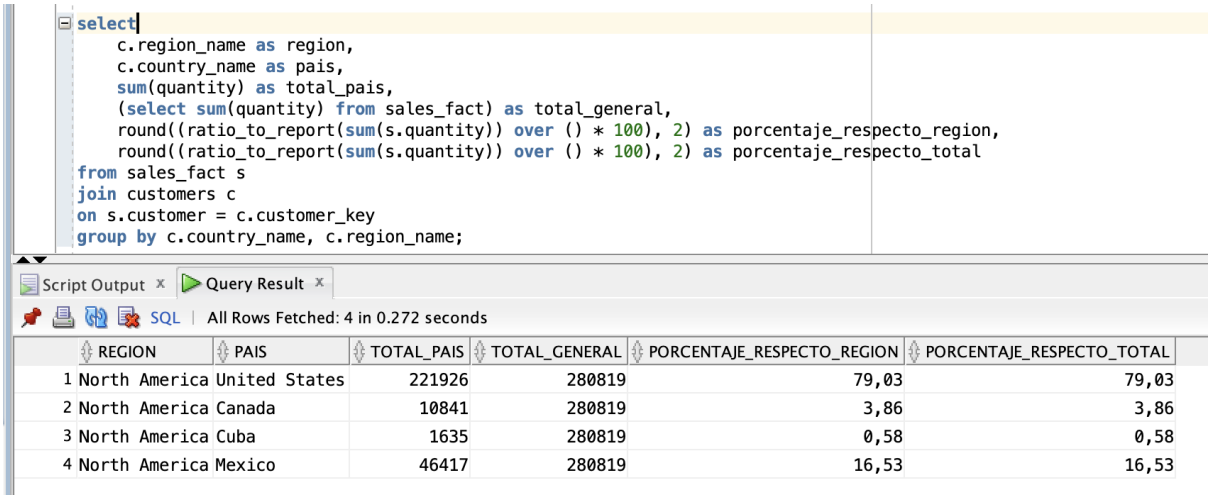
```
select
    p.category_name,
    p.item_name,
    sum(s.quantity * s.price) as total_sales,
    rank() over (partition by p.category_name order by
sum(quantity * price) desc) ranking
from sales_fact s
join products p
on s.product = p.item_key
group by s.product, p.item_name, p.category_name
order by p.category_name, ranking;
```



	CATEGORY_NAME	ITEM_NAME	TOTAL_SALES	RANKING
1	All Computer Furniture	Glacier GlacierBench 60in Cart 29Hx28D	4795,2	1
2	All Computer Furniture	Glacier FIT 60in workstation	3910,2	2
3	All Computer Furniture	Glacier Rack 24U 30.4in Deep Rack Silver	3792,4	3
4	All Computer Furniture	Glacier Rack 36U 30.4in Deep Rack Silver	3594	4
5	All Computer Furniture	Glacier Rack 36U 30.4in Deep Rack Black	3594	4
6	All Computer Furniture	Glacier Rack 24U 30.4in Deep Rack Black	2495	6
7	All Computer Furniture	Glacier Cart II 29 inch	2314,2	7
8	All Computer Furniture	Glacier 5in Casters	1251,6	8
9	All Computer Furniture	Glacier Cart II 40 inch	838	9
10	All Computer Furniture	Glacier GlacierBench	0	10
11	Computer Printers and Supplies	Digital Printing Plasmex Color Laser Supplies Pack	2613555	1
12	Computer Printers and Supplies	Digital Printing Plasmex High Capacity Maintenance Kit	449620,2	2
13	Computer Printers and Supplies	Digital Printing Plasmex Maintenance Kit	362250	3
14	Computer Printers and Supplies	Radian Duplexer	157472,6	4
15	Computer Printers and Supplies	Reliant AD440 Duplex unit CL3000N	153897	5
16	Computer Printers and Supplies	Radian DesignWriter Auto Roll Feed for 110/120/130	144088	6
17	Computer Printers and Supplies	Digital Printing Plasmex 5500DT 11x17 Mono Duplex, Tray, Network	130872	7
18	Computer Printers and Supplies	Radian 620N EIO Internal Network Card	113803	8
19	Computer Printers and Supplies	Radian Color LaserWriter 5550HDN Network 11x17	96704,4	9
20	Computer Printers and Supplies	Digital Printing Plasmex 7400DXF 12x18 36/40PPM color 10/100	85789	10
21	Computer Printers and Supplies	Digital Printing Plasmex 7760DX 12x18 Color Laser USB Ethernet Du	82588,2	11
22	Computer Printers and Supplies	Digital Printing Plasmex 5500DN 11x17 Mono 50PPM Duplex Network	80417,4	12
23	Computer Printers and Supplies	Radian LaserWriter 9050n 11x17 50PPM Ethernet 1200DPI	78409,2	13

2. Obtenga el porcentaje del total que representan las unidades vendidas de cada país con respecto al total de la región, y con respecto al total general. Incluya el nombre de la región, del país y el total de las unidades vendidas en su reporte, además de los porcentajes por supuesto.

```
select
   c.region_name as region,
   c.country_name as pais,
   sum(quantity) as total_pais,
   (select sum(quantity) from sales_fact) as total_general,
   round((ratio_to_report(sum(s.quantity)) over () * 100), 2) as
porcentaje_respecto_region,
   round((ratio_to_report(sum(s.quantity)) over () * 100), 2) as
porcentaje_respecto_total
from sales_fact s
join customers c
on s.customer = c.customer_key
group by c.country_name, c.region_name;
```



```
select
    c.region_name as region,
    c.country_name as pais,
    sum(quantity) as total_pais,
    (select sum(quantity) from sales_fact) as total_general,
    round((ratio_to_report(sum(s.quantity)) over () * 100), 2) as porcentaje_respecto_region,
    round((ratio_to_report(sum(s.quantity)) over () * 100), 2) as porcentaje_respecto_total
from sales_fact s
join customers c
on s.customer = c.customer_key
group by c.country_name, c.region_name;
```

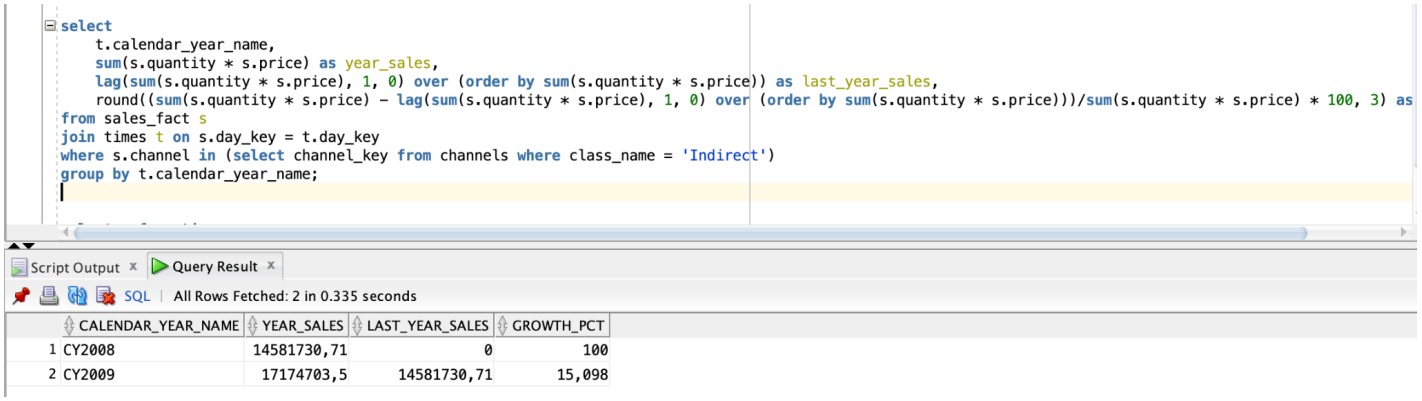
Script Output | Query Result

SQL | All Rows Fetched: 4 in 0.272 seconds

	REGION	PAIS	TOTAL_PAIS	TOTAL_GENERAL	PORCENTAJE_RESPECTO_REGION	PORCENTAJE_RESPECTO_TOTAL
1	North America	United States	221926	280819	79,03	79,03
2	North America	Canada	10841	280819	3,86	3,86
3	North America	Cuba	1635	280819	0,58	0,58
4	North America	Mexico	46417	280819	16,53	16,53

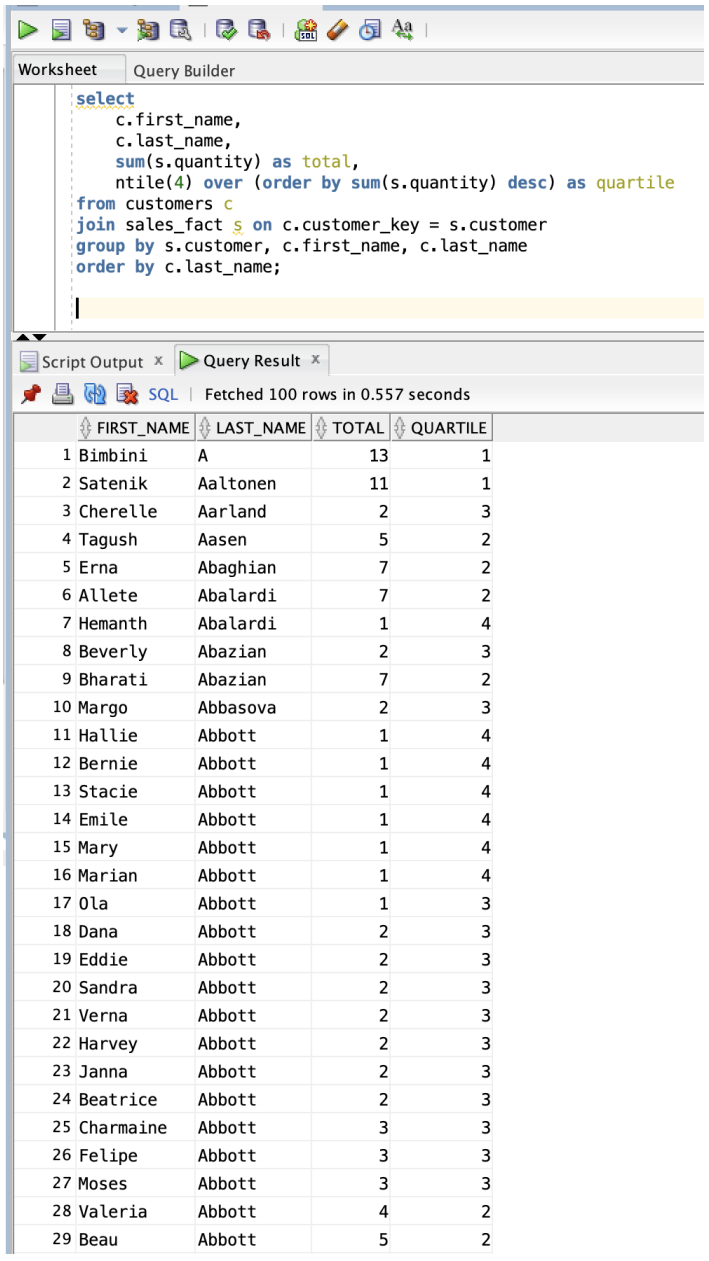
3. Obtenga el porcentaje de crecimiento de las ventas (unidades * precio) de cada año comparado con el año anterior para todos los años, considerando solamente los canales de ventas indirectos. Además del porcentaje de crecimiento, incluya para cada año el monto de las ventas del año anterior.

```
select
    t.calendar_year_name,
    sum(s.quantity * s.price) as year_sales,
    lag(sum(s.quantity * s.price), 1, 0) over (order by sum(s.quantity *
s.price)) as last_year_sales,
    round((sum(s.quantity * s.price) - lag(sum(s.quantity * s.price), 1,
0) over (order by sum(s.quantity * s.price)))/sum(s.quantity * s.price)
* 100, 3) as growth_pct
from sales_fact s
join times t on s.day_key = t.day_key
where s.channel in (select channel_key from channels where class_name =
'Indirect')
group by t.calendar_year_name;
```



4. Agrupe los clientes en cuatro grupos (cuartiles) de acuerdo a las compras basadas en unidades que han hecho históricamente, considerando las unidades de mayor a menor. Su reporte debe verse más o menos así:

```
select
    c.first_name,
    c.last_name,
    sum(s.quantity) as total,
    ntile(4) over (order by sum(s.quantity) desc) as quartile
from customers c
join sales_fact s on c.customer_key = s.customer
group by s.customer, c.first_name, c.last_name
order by c.last_name;
```



Worksheet | Query Builder

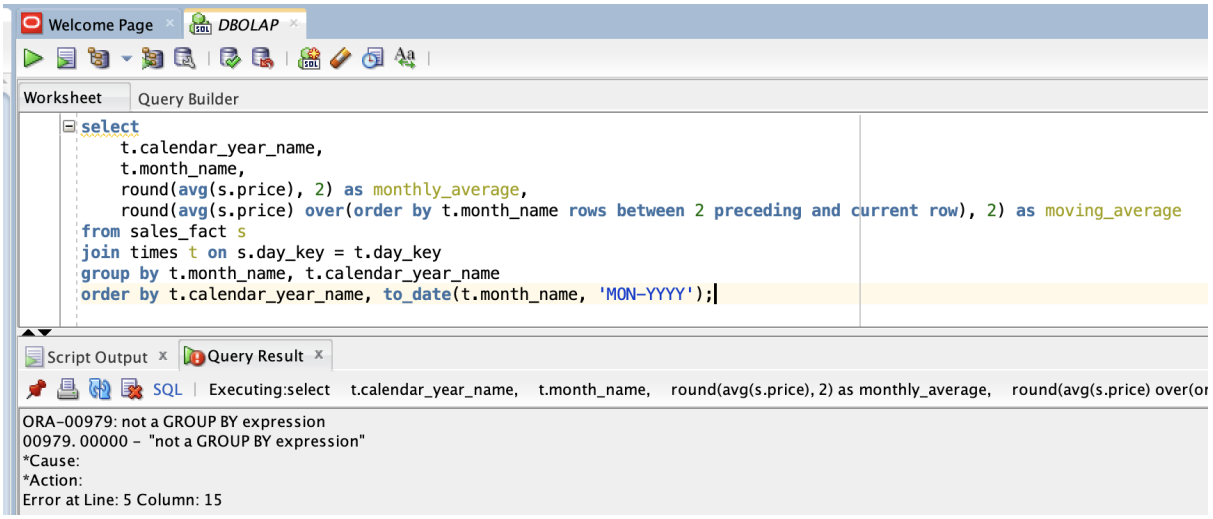
```
select
    c.first_name,
    c.last_name,
    sum(s.quantity) as total,
    ntile(4) over (order by sum(s.quantity) desc) as quartile
from customers c
join sales_fact s on c.customer_key = s.customer
group by s.customer, c.first_name, c.last_name
order by c.last_name;
```

Script Output | Query Result | SQL | Fetched 100 rows in 0.557 seconds

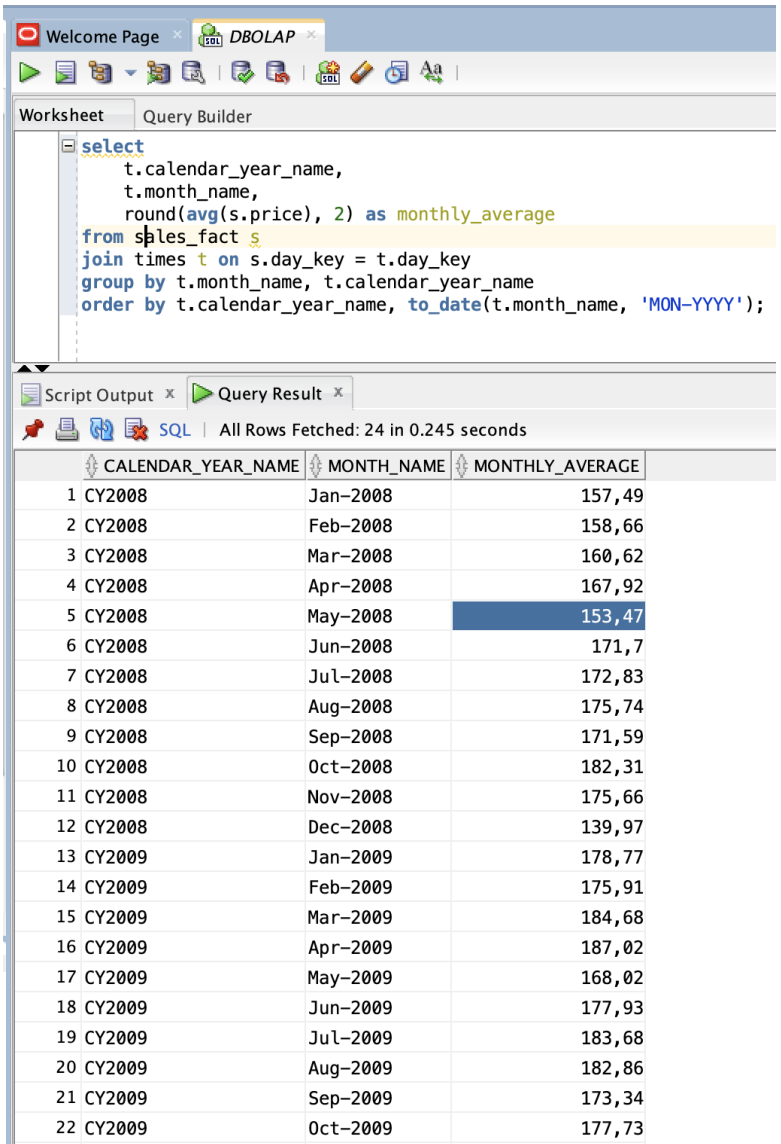
	FIRST_NAME	LAST_NAME	TOTAL	QUARTILE
1	Bimbini	A	13	1
2	Satenik	Aaltonen	11	1
3	Cherelle	Aarland	2	3
4	Tagush	Aasen	5	2
5	Erna	Abaghian	7	2
6	Allete	Abalardi	7	2
7	Hemanth	Abalardi	1	4
8	Beverly	Abazian	2	3
9	Bharati	Abazian	7	2
10	Margo	Abbasova	2	3
11	Hallie	Abbott	1	4
12	Bernie	Abbott	1	4
13	Stacie	Abbott	1	4
14	Emile	Abbott	1	4
15	Mary	Abbott	1	4
16	Marian	Abbott	1	4
17	Ola	Abbott	1	3
18	Dana	Abbott	2	3
19	Eddie	Abbott	2	3
20	Sandra	Abbott	2	3
21	Verna	Abbott	2	3
22	Harvey	Abbott	2	3
23	Janna	Abbott	2	3
24	Beatrice	Abbott	2	3
25	Charmaine	Abbott	3	3
26	Felipe	Abbott	3	3
27	Moses	Abbott	3	3
28	Valeria	Abbott	4	2
29	Beau	Abbott	5	2

5. Considerando el promedio de precio de cada mes, obtenga el promedio de este valor considerando para cada mes los 3 meses anteriores (el “promedio móvil” de los últimos 3 meses). Su reporte debe verse más o menos así:

-- En esta no logré completar el query… sé que va algo como el de abajo, pero por más que lo corro de diferentes maneras me dio error:



-- Removiendo lo que da error:



	CALENDAR_YEAR_NAME	MONTH_NAME	MONTHLY_AVERAGE
1	CY2008	Jan-2008	157,49
2	CY2008	Feb-2008	158,66
3	CY2008	Mar-2008	160,62
4	CY2008	Apr-2008	167,92
5	CY2008	May-2008	153,47
6	CY2008	Jun-2008	171,7
7	CY2008	Jul-2008	172,83
8	CY2008	Aug-2008	175,74
9	CY2008	Sep-2008	171,59
10	CY2008	Oct-2008	182,31
11	CY2008	Nov-2008	175,66
12	CY2008	Dec-2008	139,97
13	CY2009	Jan-2009	178,77
14	CY2009	Feb-2009	175,91
15	CY2009	Mar-2009	184,68
16	CY2009	Apr-2009	187,02
17	CY2009	May-2009	168,02
18	CY2009	Jun-2009	177,93
19	CY2009	Jul-2009	183,68
20	CY2009	Aug-2009	182,86
21	CY2009	Sep-2009	173,34
22	CY2009	Oct-2009	177,73