TARGET BUSINESS CASE STUDY

Import the dataset and do usual exploratory analysis steps like checking the structure & characteristics of the dataset:

1.Data type of all columns in the "customers" table.

Field name	Type
customer_id	STRING
customer_unique_id	STRING
customer_zip_code_prefix	INTEGER
customer_city	STRING
customer_state	STRING

2.Get the time range between which the orders were placed.

Query :

```
SELECT
min(order_purchase_timestamp) as range_from,
max(order_purchase_timestamp) as range_to
FROM `circular-matrix-406015.Target.orders`
```

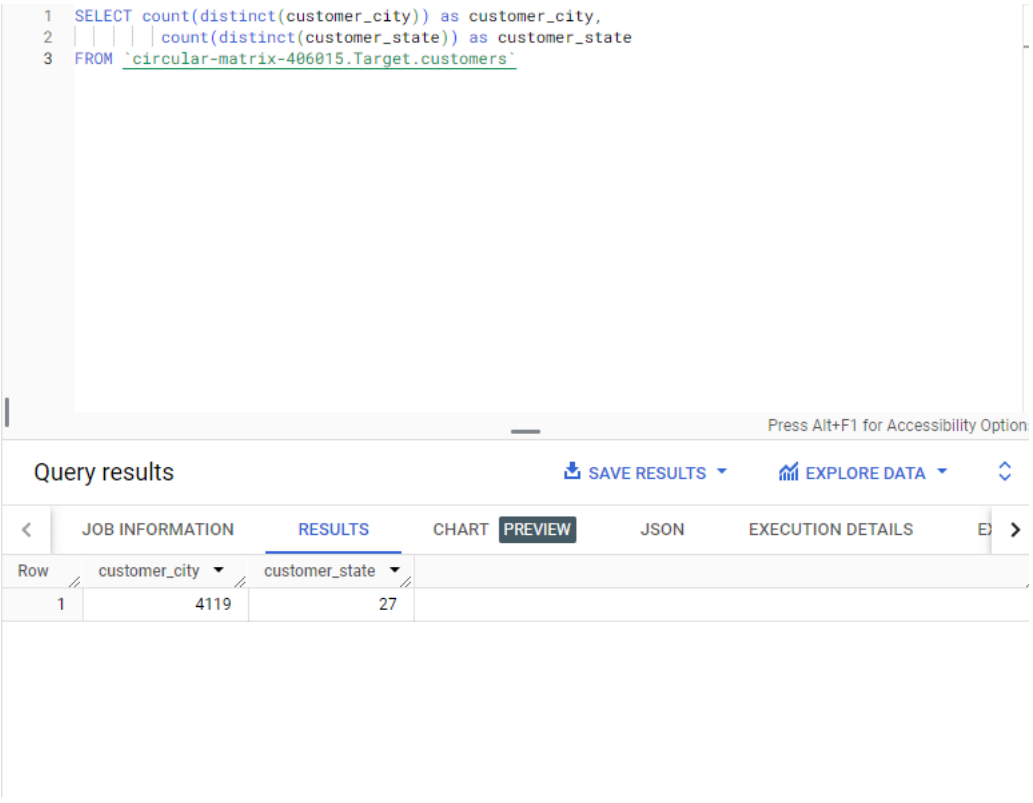
Output:

3.Count the Cities & States of customers who ordered during the given period.

Query :

```
SELECT count(distinct(customer_city)) as customer_city,
       count(distinct(customer_state)) as customer_state
FROM `circular-matrix-406015.Target.customers`
```

Output:



Insights

There are over 5000+ cities in brazil, but order is coming from only 4119 cities

TARGET BUSINESS CASE STUDY

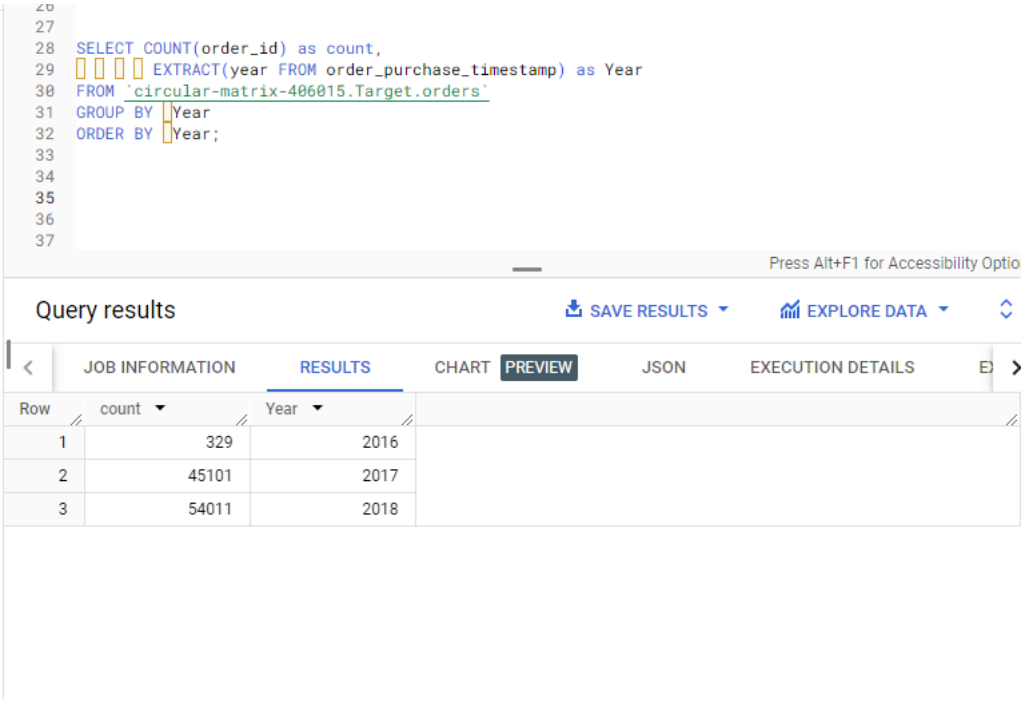
In-depth Exploration

1.Is there a growing trend in the no. of orders placed over the past years?

Query

```
SELECT COUNT(order_id) as count,
    EXTRACT(year FROM order_purchase_timestamp) as Year
FROM `circular-matrix-406015.Target.orders`
GROUP BY  Year
ORDER BY  Year;
```

Output:



Insights

On, 2016 target has only 329 in order count, but in next year, it has been drastically increased to 45k order count, then again it was a drop to 8910 order in 2018.

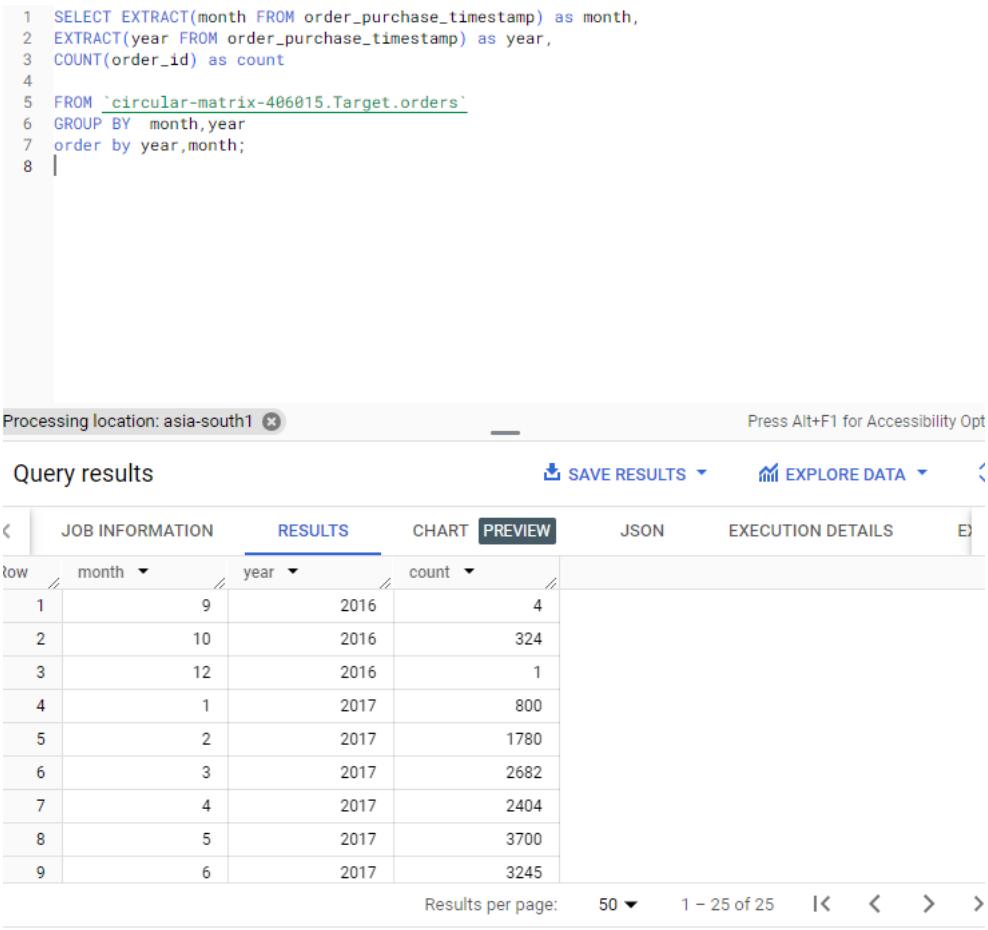
May be because of offers, promotion etc.

2.Can we see some kind of monthly seasonality in terms of the no. of orders being placed?

Query

```
SELECT
EXTRACT(month FROM order_purchase_timestamp) as month,
EXTRACT(year FROM order_purchase_timestamp) as year,
COUNT(order_id) as count

FROM `circular-matrix-406015.Target.orders`
GROUP BY  month,year
order by year,month;
```

Output



Processing location: asia-south1 — Press Alt+F1 for Accessibility Opt

Query results — SAVE RESULTS — EXPLORE DATA

JOB INFORMATION | RESULTS | CHART | PREVIEW | JSON | EXECUTION DETAILS

Row	month	year	count
1	9	2016	4
2	10	2016	324
3	12	2016	1
4	1	2017	800
5	2	2017	1780
6	3	2017	2682
7	4	2017	2404
8	5	2017	3700
9	6	2017	3245

Results per page: 50 — 1 – 25 of 25

Insights

Every quarter, order has been increasing steadily, but in every last quarter, there is a fall of order. Best quarter will be 3rd .

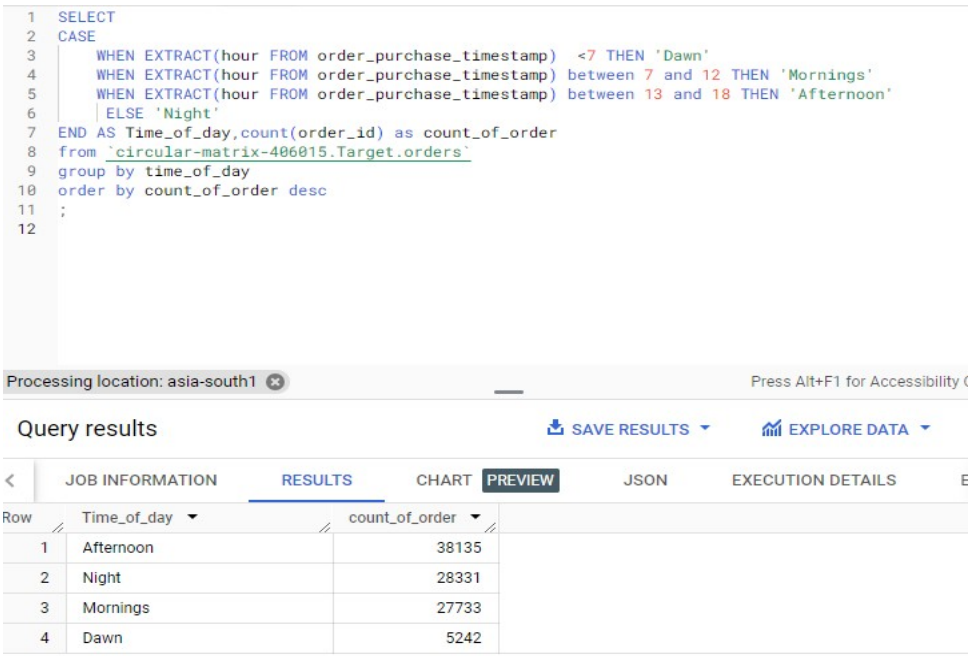
3.During what time of the day, do the Brazilian customers mostly place their orders? (Dawn, Morning, Afternoon or Night)

0-6 hrs : Dawn | 7-12 hrs : Mornings | 13-18 hrs : Afternoon | 19-23 hrs : Night

Query :

```
SELECT
CASE
  WHEN EXTRACT(hour FROM order_purchase_timestamp)  <7 THEN
'Dawn'
  WHEN EXTRACT(hour FROM order_purchase_timestamp) between 7
and 12 THEN 'Mornings'
  WHEN EXTRACT(hour FROM order_purchase_timestamp) between 13
and 18 THEN 'Afternoon'
   ELSE 'Night'
END AS Time_of_day,count(order_id) as count_of_order
from `circular-matrix-406015.Target.orders`
group by time_of_day
order by count_of_order desc ;
```

Output:



Order has getting higher only in afternoon, followed by night and morning

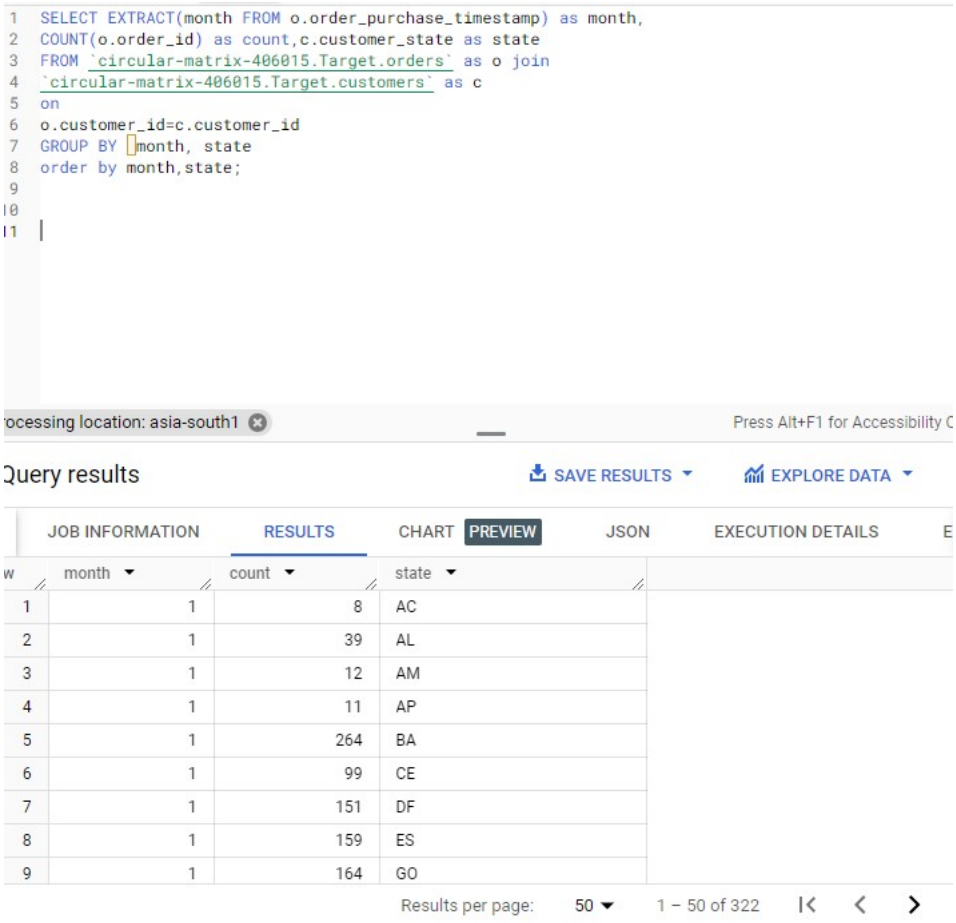
1.Evolution of E-commerce orders in the Brazil region:

1.Get the month on month no. of orders placed in each state.

Query :

```
SELECT
EXTRACT(month FROM o.order_purchase_timestamp) as month,
COUNT(o.order_id) as count,c.customer_state as state
FROM `circular-matrix-406015.Target.orders` as o join
`circular-matrix-406015.Target.customers` as c on
o.customer_id=c.customer_id
GROUP BY  month, state
order by month,state;
```

Output



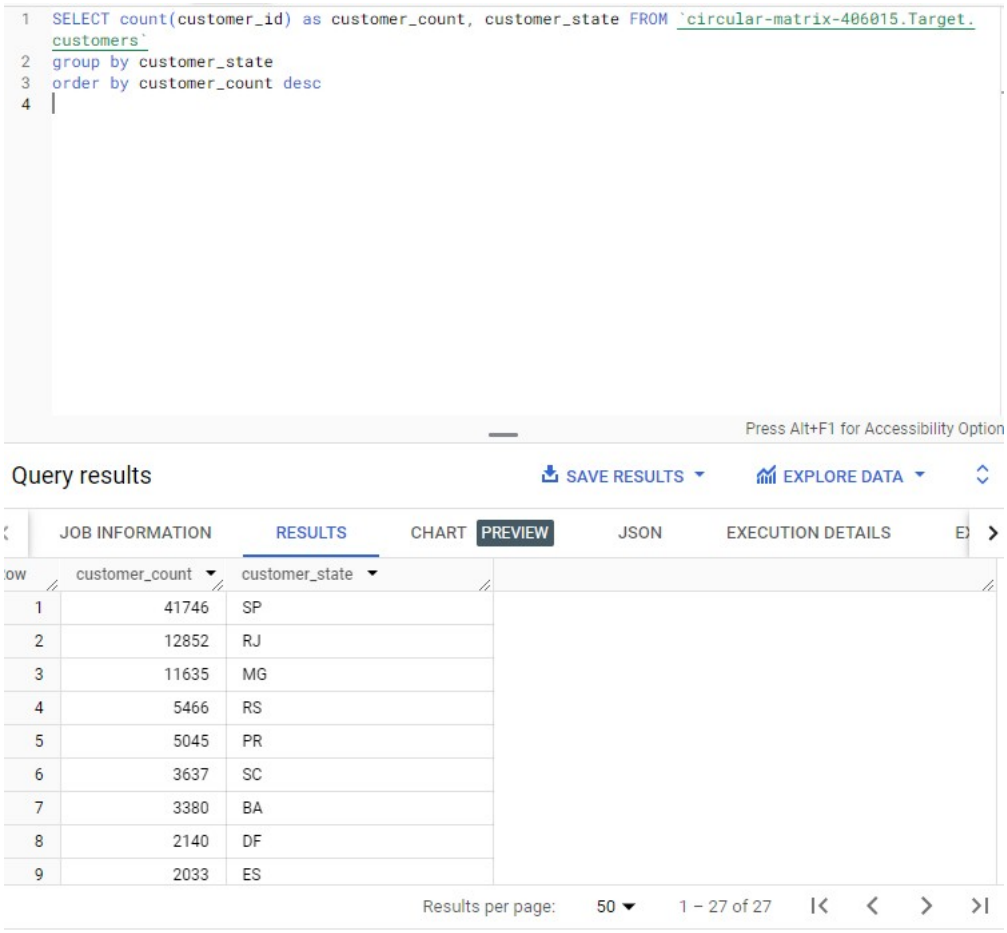
SP state has the highest no.of order in every month

2.How are the customers distributed across all the states?

Query

```
SELECT
count(customer_id) as customer_count, customer_state FROM
`circular-matrix-406015.Target.customers`
group by customer_state
order by customer_count desc
```

Output



Top 3 customer_count state is SP,RJ,&MG

Impact on Economy: Analyze the money movement by e-commerce by looking at order prices, freight and others.

Get the % increase in the cost of orders from year 2017 to 2018 (include months between Jan to Aug only).You can use the "payment_value" column in the payments table to get the cost of orders.

Query

```
with refcol AS
  (SELECT sum(case
    WHEN extract(year
  FROM o.order_purchase_timestamp) = 2017 THEN
    p.payment_value
    ELSE 0 end) AS sum2017, sum(case
    WHEN extract(year
  FROM o.order_purchase_timestamp) = 2018 THEN
    p.payment_value
    ELSE 0 end) AS sum2018,
  FROM `circular-matrix-406015.Target.orders` AS o
  JOIN `circular-matrix-406015.Target.payments` AS p
    ON o.order_id =p.order_id
  WHERE extract(month
  FROM o.order_purchase_timestamp) <9 )
SELECT ((sum2018-sum2017)/sum2017) *100 AS percentage
FROM refcol;
```

Output

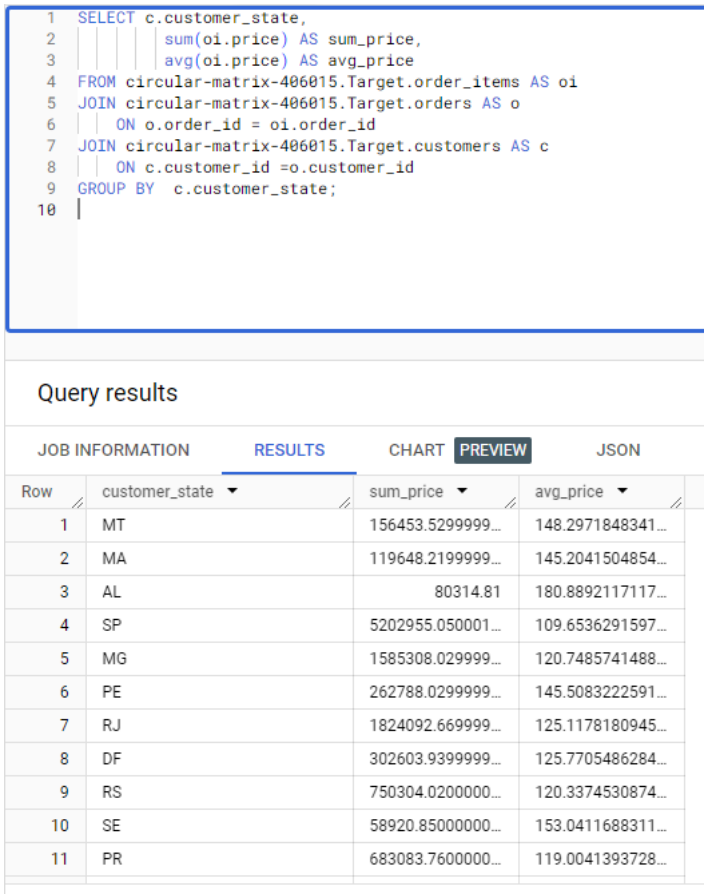
136% has been increased in the cost of orders from year 2017 to 2018

Calculate the Total & Average value of order price for each state.

Query

```
SELECT c.customer_state,
    sum(oi.price) AS sum_price,
    avg(oi.price) AS avg_price
FROM circular-matrix-406015.Target.order_items AS oi
JOIN circular-matrix-406015.Target.orders AS o
  ON o.order_id = oi.order_id
JOIN circular-matrix-406015.Target.customers AS c
  ON c.customer_id =o.customer_id
GROUP BY  c.customer_state
```

Output



```
SELECT c.customer_state,
        sum(oi.price) AS sum_price,
        avg(oi.price) AS avg_price
FROM circular-matrix-406015.Target.order_items AS oi
JOIN circular-matrix-406015.Target.orders AS o
    ON o.order_id = oi.order_id
JOIN circular-matrix-406015.Target.customers AS c
    ON c.customer_id =o.customer_id
GROUP BY  c.customer_state;
```

Query results

JOB INFORMATION | RESULTS | CHART PREVIEW | JSON

Row	customer_state	sum_price	avg_price
1	MT	156453.5299999...	148.2971848341...
2	MA	119648.2199999...	145.2041504854...
3	AL	80314.81	180.8892117117...
4	SP	5202955.050001...	109.6536291597...
5	MG	1585308.029999...	120.7485741488...
6	PE	262788.0299999...	145.5083222591...
7	RJ	1824092.669999...	125.1178180945...
8	DF	302603.9399999...	125.7705486284...
9	RS	750304.0200000...	120.3374530874...
10	SE	58920.85000000...	153.0411688311...
11	PR	683083.7600000...	119.0041393728...

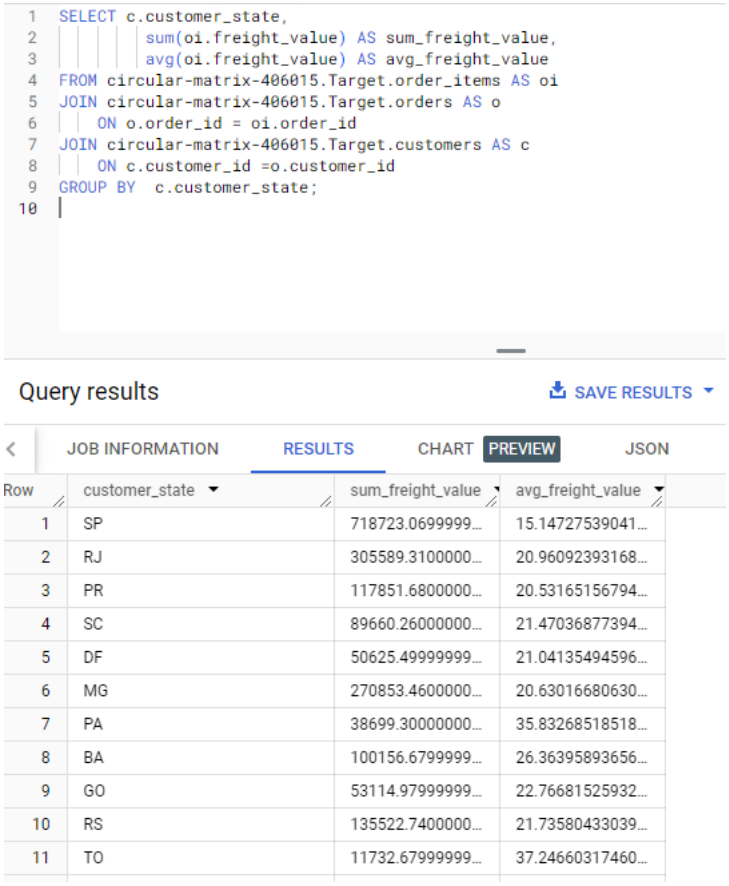
SP state has the avg price is 109, and has the highest order value

Calculate the Total & Average value of order freight for each state.

Query

```
SELECT c.customer_state,
    sum(oi.freight_value) AS sum_freight_value,
    avg(oi.freight_value) AS avg_freight_value
FROM circular-matrix-406015.Target.order_items AS oi
JOIN circular-matrix-406015.Target.orders AS o
  ON o.order_id = oi.order_id
JOIN circular-matrix-406015.Target.customers AS c
  ON c.customer_id =o.customer_id
GROUP BY  c.customer_state;
```

Output



Query results

SAVE RESULTS

JOB INFORMATION | RESULTS | CHART PREVIEW | JSON

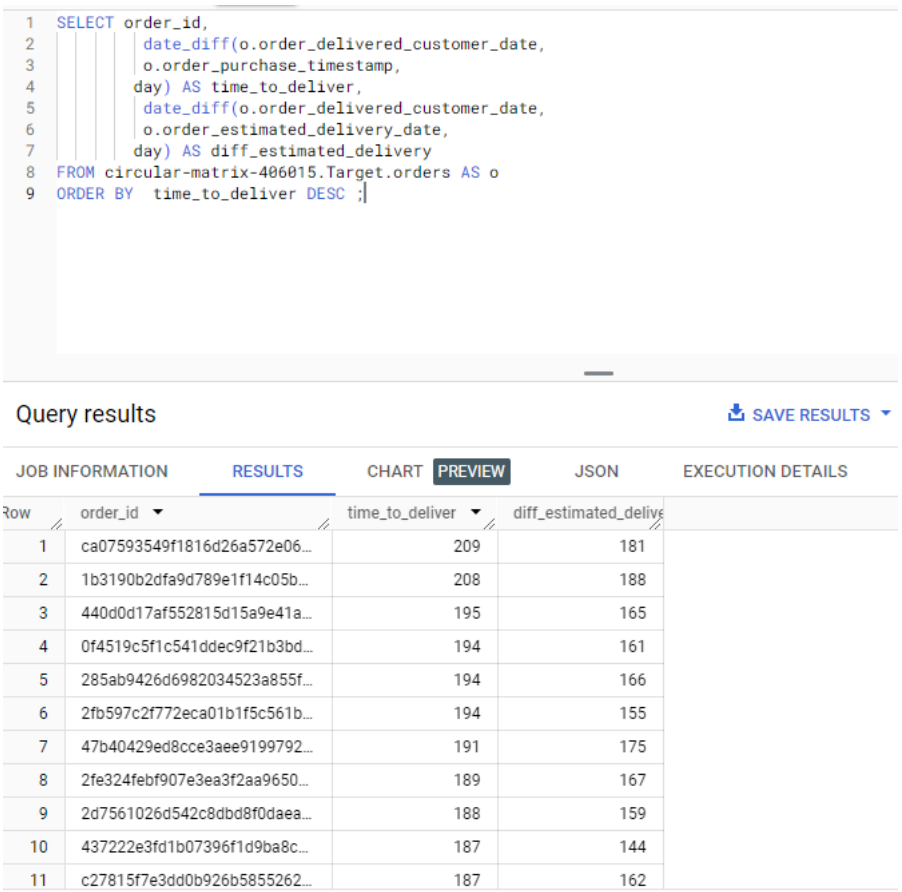
Row	customer_state	sum_freight_value	avg_freight_value
1	SP	718723.0699999...	15.14727539041...
2	RJ	305589.3100000...	20.96092393168...
3	PR	117851.6800000...	20.53165156794...
4	SC	89660.26000000...	21.47036877394...
5	DF	50625.49999999...	21.04135494596...
6	MG	270853.4600000...	20.63016680630...
7	PA	38699.30000000...	35.83268518518...
8	BA	100156.6799999...	26.36395893656...
9	GO	53114.97999999...	22.76681525932...
10	RS	135522.7400000...	21.73580433039...
11	TO	11732.67999999...	37.24660317460...

Freight charges is between 15- 42, more order went from the state is SP

Analysis based on sales, freight and delivery time.

1. Find the no. of days taken to deliver each order from the order's purchase date as delivery time.
   Also, calculate the difference (in days) between the estimated & actual delivery date of an order.Do this in a single query.
   You can calculate the delivery time and the difference between the estimated & actual delivery date using the given formula:
2. **time_to_deliver** = order_delivered_customer_date - order_purchase_timestamp
   diff_estimated_delivery = order_delivered_customer_date – order_estimated_delivery_date

```
SELECT order_id,
    date_diff(o.order_delivered_customer_date,
o.order_purchase_timestamp, day) AS time_to_deliver,
    date_diff(o.order_delivered_customer_date,
o.order_estimated_delivery_date, day) AS
diff_estimated_delivery
FROM circular-matrix-406015.Target.orders AS o
ORDER BY  time_to_deliver DESC ;
```



3. Find out the top 5 states with the highest & lowest average freight value.

```
SELECT t.customer_state,
    t.avgfrt,
  CASE
  WHEN t.rn_up <= 5 THEN  'Low_avg'
  WHEN t.rn_down <= 5 THEN  'High_avg'
  END AS freight_range
FROM
  (SELECT c.customer_state,
    avg(oi.freight_value) AS avgfrt ,
    DENSE_RANK()
   OVER (ORDER BY avg(oi.freight_value) ASC) AS rn_up,
DENSE_RANK()
   OVER (ORDER BY avg(oi.freight_value) DESC) AS rn_down
  FROM circular-matrix-406015.Target.order_items AS oi
  JOIN circular-matrix-406015.Target.orders AS o
   ON o.order_id = oi.order_id
  JOIN circular-matrix-406015.Target.customers AS c
   ON c.customer_id =o.customer_id
  GROUP BY  c.customer_state ) AS t
WHERE t.rn_up <= 5    OR t.rn_down <= 5
ORDER BY  T.AVGFRT;
```

```
1
2  SELECT t.customer_state,
3         t.avgfrt,
4
5    CASE
6    WHEN t.rn_up <= 5 THEN
7    'Low_avg'
8    WHEN t.rn_down <= 5 THEN
9    'High_avg'
10   END AS freight_range
11 FROM
12   (SELECT c.customer_state,
13         avg(oi.freight_value) AS avgfrt ,
14         DENSE_RANK()
15       OVER (ORDER BY avg(oi.freight_value) ASC) AS rn_up, DENSE_RANK()
16       OVER (ORDER BY avg(oi.freight_value) DESC) AS rn_down
17   FROM circular-matrix-406015.Target.order_items AS oi
18   JOIN circular-matrix-406015.Target.orders AS o
19     ON o.order_id = oi.order_id
```

Press

Query results

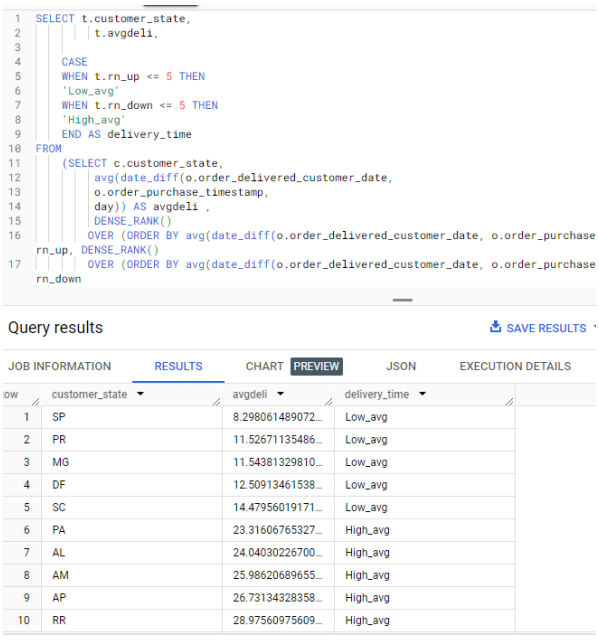
SAVE RESULTS

JOB INFORMATION | RESULTS | CHART PREVIEW | JSON | EXECUTION DETAILS | EXECUT

Row	customer_state	avgfrt	freight_range
1	SP	15.14727539041...	Low_avg
2	PR	20.53165156794...	Low_avg
3	MG	20.63016680630...	Low_avg
4	RJ	20.96092393168...	Low_avg
5	DF	21.04135494596...	Low_avg
6	PI	39.14797047970...	High_avg
7	AC	40.07336956521...	High_avg
8	RO	41.06971223021...	High_avg
9	PB	42.72380398671...	High_avg
10	RR	42.98442307692...	High_avg

4. Find out the top 5 states with the highest & lowest average delivery time.

```
SELECT t.customer_state,
    t.avgdeli,
  CASE
  WHEN t.rn_up <= 5 THEN
  'Low_avg'
  WHEN t.rn_down <= 5 THEN
  'High_avg'
  END AS delivery_time
FROM
  (SELECT c.customer_state,
    avg(date_diff(o.order_delivered_customer_date,
    o.order_purchase_timestamp,
    day)) AS avgdeli ,
    DENSE_RANK()    OVER (ORDER BY
avg(date_diff(o.order_delivered_customer_date,
o.order_purchase_timestamp, day)) ASC) AS rn_up, DENSE_RANK()
    OVER (ORDER BY
avg(date_diff(o.order_delivered_customer_date,
o.order_purchase_timestamp, day)) DESC) AS rn_down
  FROM circular-matrix-406015.Target.orders AS o
  JOIN circular-matrix-406015.Target.customers AS c
    ON c.customer_id =o.customer_id
  GROUP BY  c.customer_state ) AS t
WHERE t.rn_up <= 5    OR t.rn_down <= 5
ORDER BY  t.avgdeli;
```



Query results

SAVE RESULTS

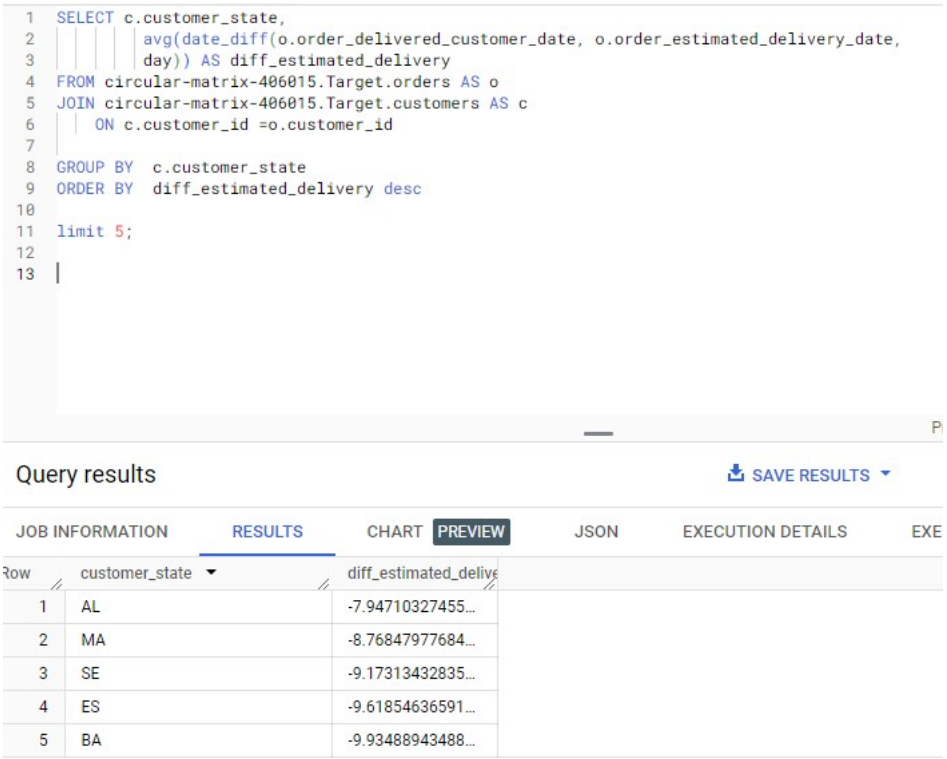
JOB INFORMATION | RESULTS | CHART PREVIEW | JSON | EXECUTION DETAILS

row	customer_state	avgdeli	delivery_time
1	SP	8.298061489072...	Low_avg
2	PR	11.52671135486...	Low_avg
3	MG	11.54381329810...	Low_avg
4	DF	12.50913461538...	Low_avg
5	SC	14.47956019171...	Low_avg
6	PA	23.31606765327...	High_avg
7	AL	24.04030226700...	High_avg
8	AM	25.98620689655...	High_avg
9	AP	26.73134328358...	High_avg
10	RR	28.97560975609...	High_avg

5. Find out the top 5 states where the order delivery is really fast as compared to the estimated date of delivery.

You can use the difference between the averages of actual & estimated delivery date to figure out how fast the delivery was for each state.

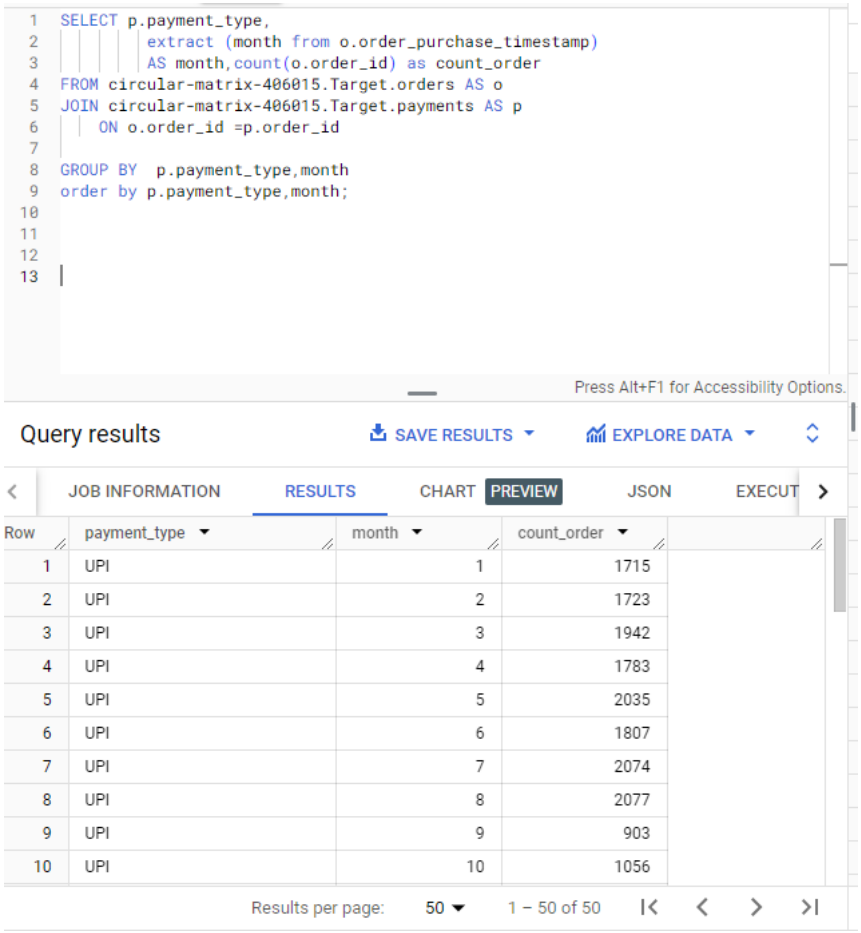
```
SELECT c.customer_state,
    avg(date_diff(o.order_delivered_customer_date,
o.order_estimated_delivery_date,
    day)) AS diff_estimated_delivery
FROM circular-matrix-406015.Target.orders AS o
JOIN circular-matrix-406015.Target.customers AS c
  ON c.customer_id =o.customer_id

GROUP BY  c.customer_state
ORDER BY  diff_estimated_delivery desc

limit 5;
```



Analysis based on the payments:

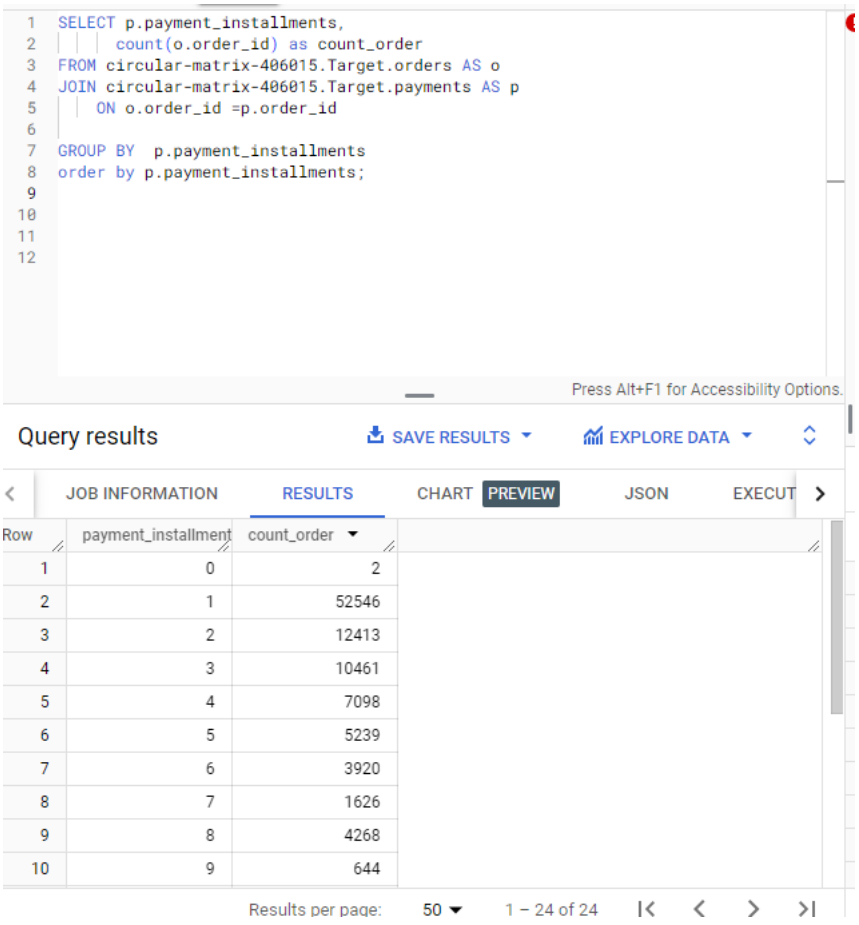
1. Find the month on month no. of orders placed using different payment types.

```
SELECT p.payment_type,
    extract (month from o.order_purchase_timestamp)
    AS month,count(o.order_id) as count_order
FROM circular-matrix-406015.Target.orders AS o
JOIN circular-matrix-406015.Target.payments AS p
  ON o.order_id =p.order_id

GROUP BY  p.payment_type,month
order by p.payment_type,month;
```



2. Find the no. of orders placed on the basis of the payment installments that have been paid.

```
SELECT p.payment_installments,
   count(o.order_id) as count_order
FROM circular-matrix-406015.Target.orders AS o
JOIN circular-matrix-406015.Target.payments AS p
  ON o.order_id =p.order_id

GROUP BY  p.payment_installments
order by p.payment_installments;
```



```
SELECT p.payment_installments,
    count(o.order_id) as count_order
FROM circular-matrix-406015.Target.orders AS o
JOIN circular-matrix-406015.Target.payments AS p
  ON o.order_id =p.order_id

GROUP BY  p.payment_installments
order by p.payment_installments;
```

Press Alt+F1 for Accessibility Options.

Query results

SAVE RESULTS | EXPLORE DATA

JOB INFORMATION | RESULTS | CHART PREVIEW | JSON | EXECUT

Row	payment_installment	count_order
1	0	2
2	1	52546
3	2	12413
4	3	10461
5	4	7098
6	5	5239
7	6	3920
8	7	1626
9	8	4268
10	9	644

Results per page: 50 1 – 24 of 24