NAME - VEERESH WALI

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

1. **Data type of columns in a table**
2. **Time period for which the data is given**
3. **Cities and States of customers ordered during the given period**

<u>Data type of columns in a table</u>

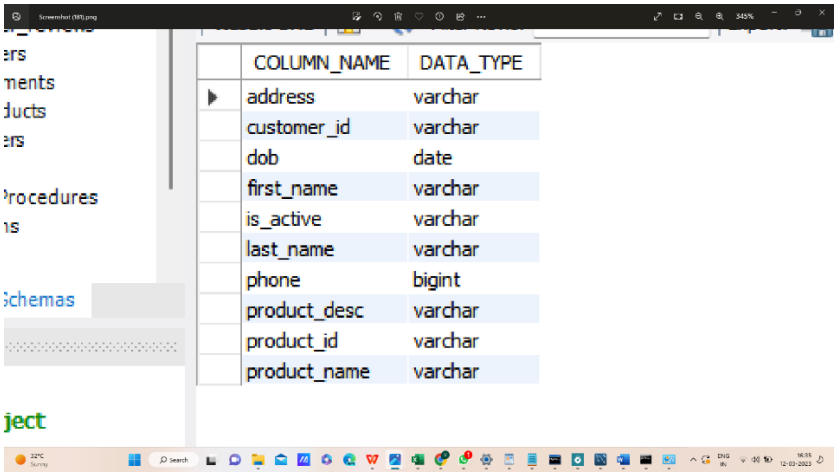
-- **CUSTOMERS**

```
select * from customers;

select column_name ,data_type

from information_schema.columns

where table_name="customers";
```



COLUMN_NAME	DATA_TYPE
address	varchar
customer_id	varchar
dob	date
first_name	varchar
is_active	varchar
last_name	varchar
phone	bigint
product_desc	varchar
product_id	varchar
product_name	varchar

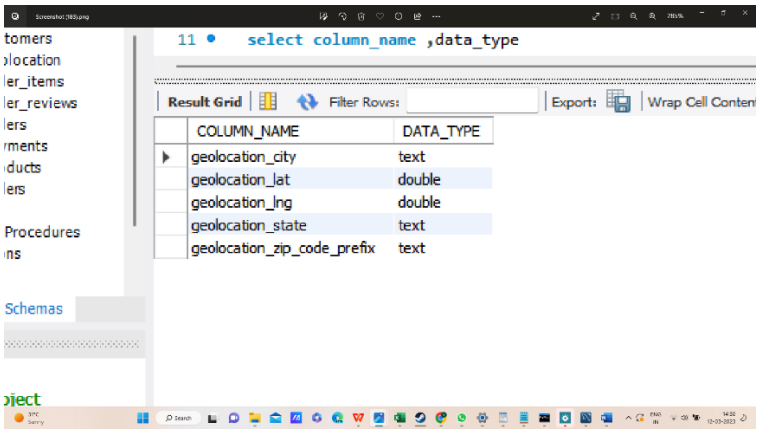
-- GEOLOCATION

select*from geolocation;

select column_name ,data_type

from information_schema.columns

where table_name="geolocation";

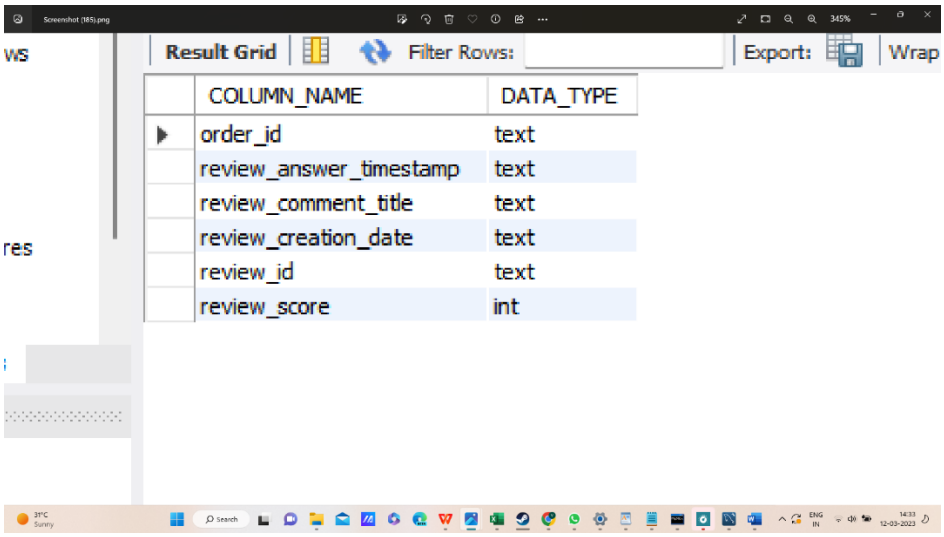


-- ORDER_REVIEWS

select column_name ,data_type

from information_schema.columns

where table_name="order_reviews";

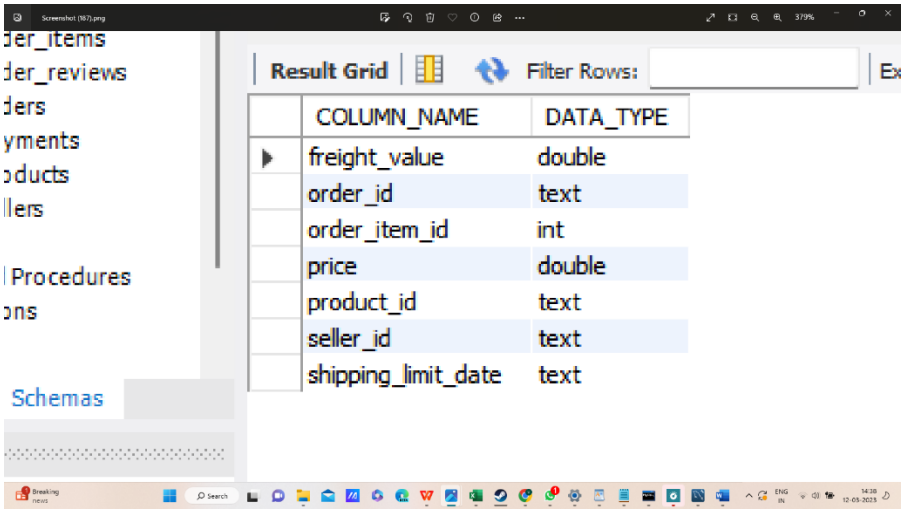


-- ORDER_ITEMS

select column_name ,data_type

from information_schema.columns

where table_name="order_items";



Result Grid | Filter Rows:

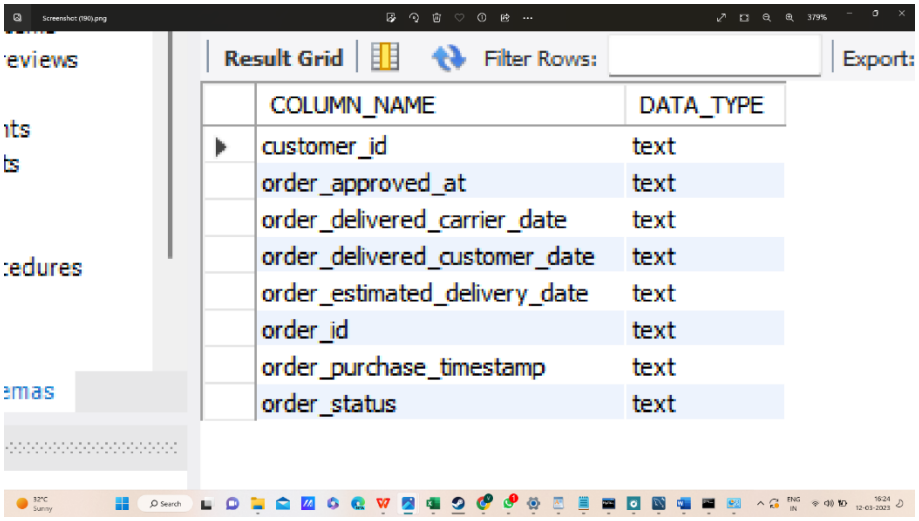
COLUMN_NAME	DATA_TYPE
freight_value	double
order_id	text
order_item_id	int
price	double
product_id	text
seller_id	text
shipping_limit_date	text

-- ORDERS

select column_name ,data_type

from information_schema.columns

where table_name="orders";



Result Grid | Filter Rows: | Export:

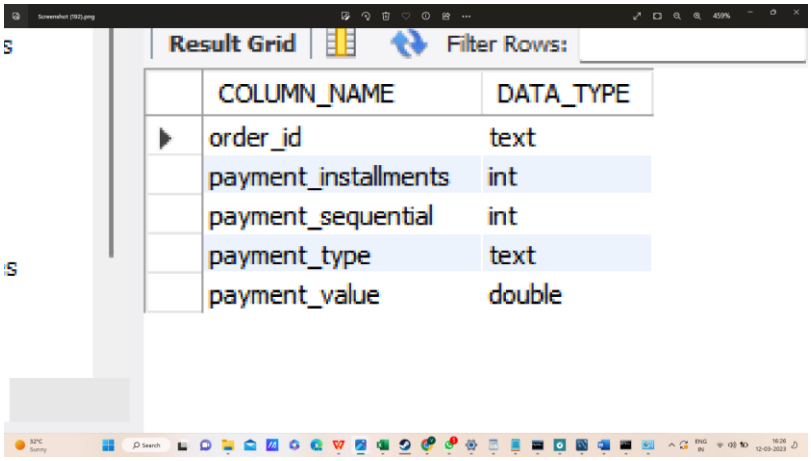
COLUMN_NAME	DATA_TYPE
customer_id	text
order_approved_at	text
order_delivered_carrier_date	text
order_delivered_customer_date	text
order_estimated_delivery_date	text
order_id	text
order_purchase_timestamp	text
order_status	text

-- PAYMENTS

```
select column_name ,data_type

from information_schema.columns

where table_name="payments";
```



Result Grid | Filter Rows:

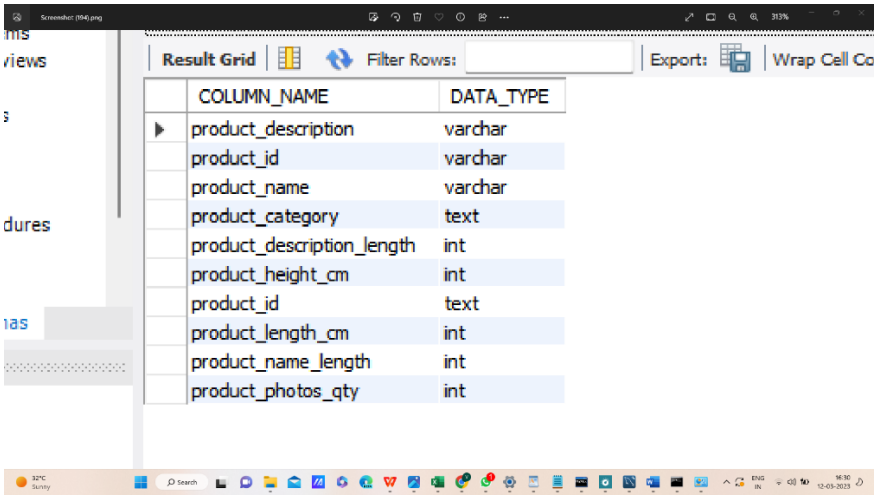
COLUMN_NAME	DATA_TYPE
order_id	text
payment_installments	int
payment_sequential	int
payment_type	text
payment_value	double

-- PRODUCTS

```
select column_name ,data_type

from information_schema.columns

where table_name="products";
```



Result Grid | Filter Rows: | Export: | Wrap Cell Co

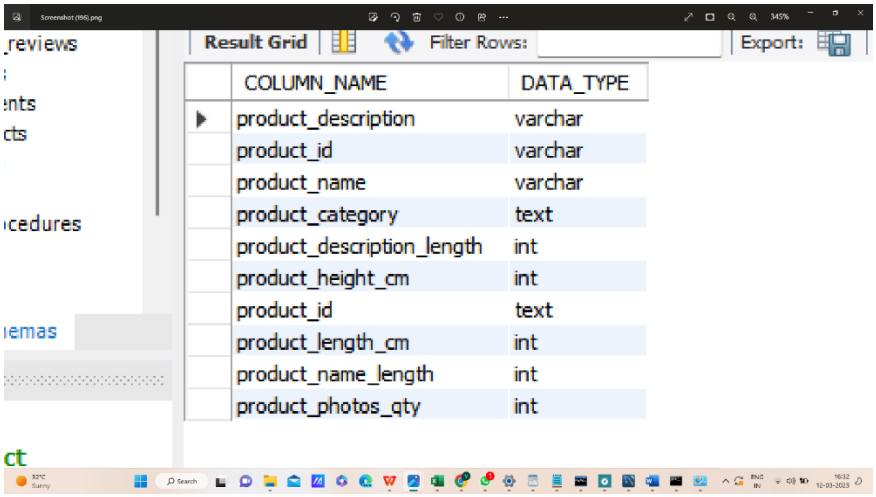
COLUMN_NAME	DATA_TYPE
product_description	varchar
product_id	varchar
product_name	varchar
product_category	text
product_description_length	int
product_height_cm	int
product_id	text
product_length_cm	int
product_name_length	int
product_photos_qty	int

-- **SELLERS**

```
select column_name ,data_type

from information_schema.columns

where table_name="sellers";
```



COLUMN_NAME	DATA_TYPE
product_description	varchar
product_id	varchar
product_name	varchar
product_category	text
product_description_length	int
product_height_cm	int
product_id	text
product_length_cm	int
product_name_length	int
product_photos_qty	int

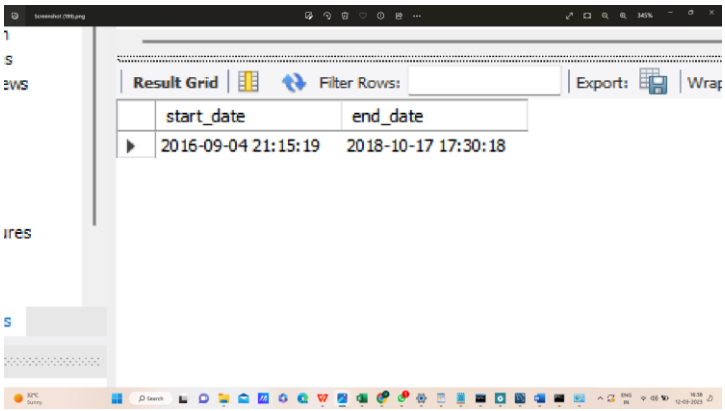
Time period for which the data is given

```
Select

   min(order_purchase_timestamp) as start_date,

   max(order_purchase_timestamp) as end_date

from orders;
```



start_date	end_date
2016-09-04 21:15:19	2018-10-17 17:30:18

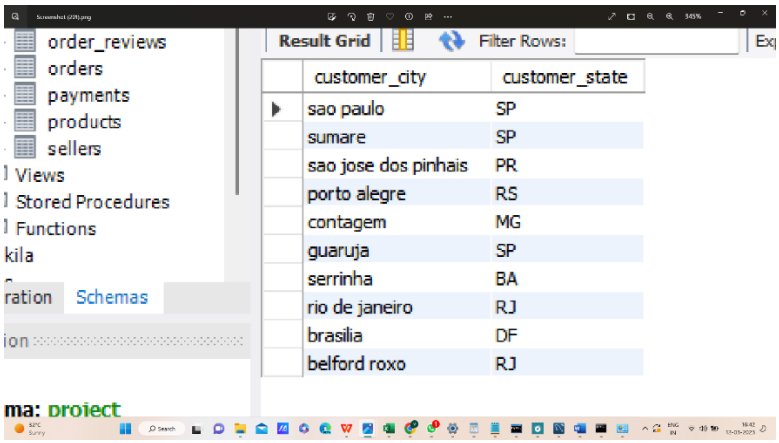
Cities and States of customers ordered during the given period

Select distinct customer_city, customer_state

from customers

Join orders ON customers.customer_id = orders.customer_id

where order_purchase_timestamp between '2016-09-04' and '2018-10-17'



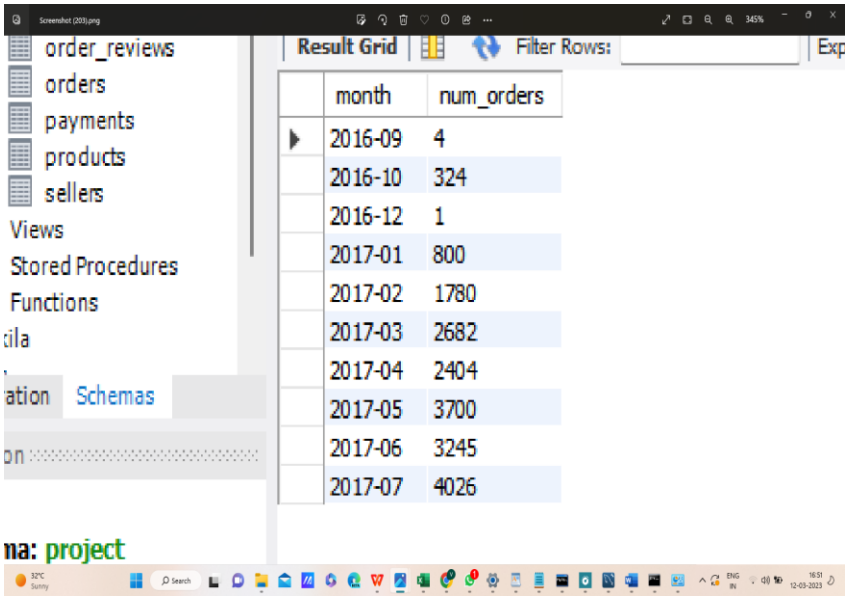
2)In-depth Exploration:

1. **Is there a growing trend on e-commerce in Brazil? How can we describe a complete scenario? Can we see some seasonality with peaks at specific months?**
2. **What time do Brazilian customers tend to buy (Dawn, Morning, Afternoon or Night)**

Is there a growing trend on e-commerce in Brazil? How can we describe a complete scenario? Can we see some seasonality with peaks at specific months?

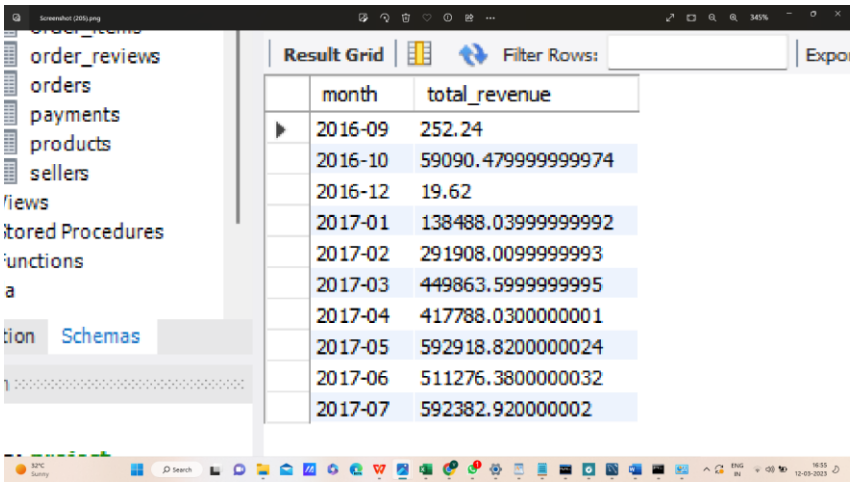
Total number of orders per month

```
Select date_format    (order_purchase_timestamp, '%Y-%m') asmonth, count(*)as num_orders
from orders
group by month
order by month;
```



Total revenue per month

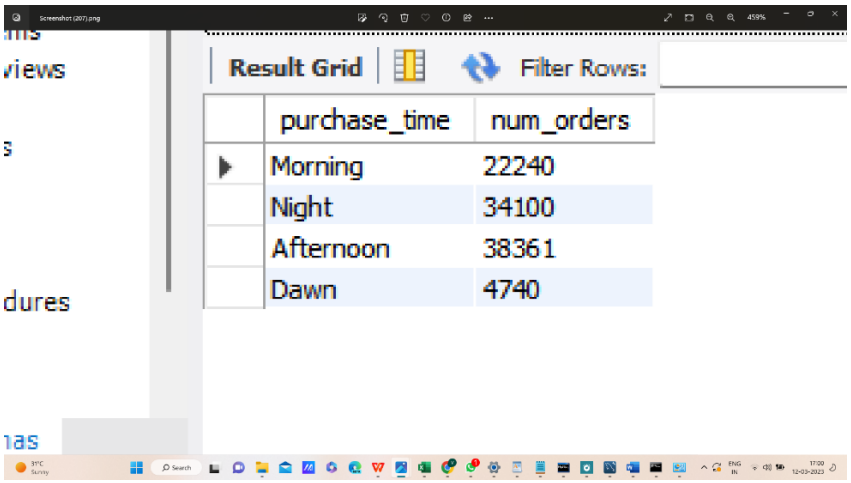
```
Select date_format(order_purchase_timestamp, '%Y-%m') as month, Sum(payment_value) as total_revenue
From orders o
Join payments p on o.order_id = p.order_id
Group by month
Order BY month;
```



month	total_revenue
2016-09	252.24
2016-10	59090.479999999974
2016-12	19.62
2017-01	138488.03999999992
2017-02	291908.0099999993
2017-03	449863.5999999995
2017-04	417788.0300000001
2017-05	592918.8200000024
2017-06	511276.3800000032
2017-07	592382.920000002

What time do Brazilian customers tend to buy (Dawn, Morning, Afternoon or Night)?

```
select
  case
 when hour (order_purchase_timestamp) >= 0 and hour(order_purchase_timestamp) < 6 then
'Dawn'
    when hour (order_purchase_timestamp) >= 6 and hour(order_purchase_timestamp) < 12 then
'Morning'
  when hour (order_purchase_timestamp) >= 12 and hour(order_purchase_timestamp) < 18 then
'Afternoon'
    else 'Night'
  end as purchase_time,
  count(*) AS num_orders
from
  orders
group by
  purchase_time
limit 0, 10;
```



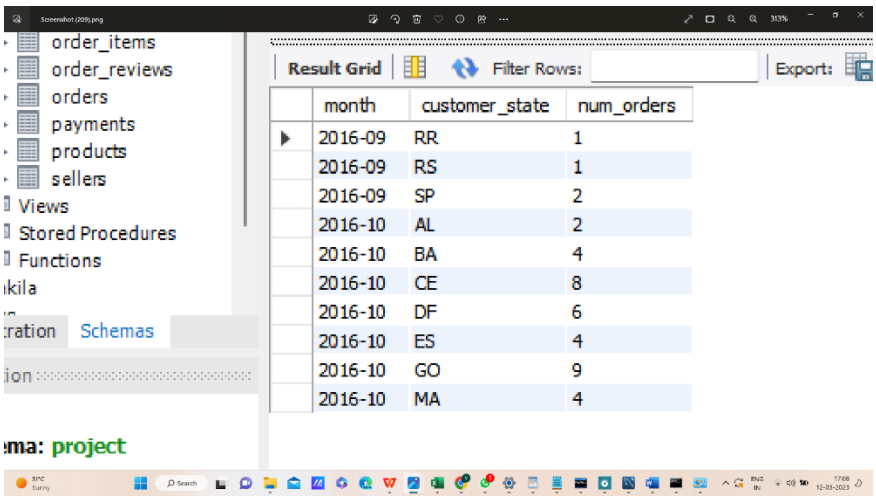
purchase_time	num_orders
Morning	22240
Night	34100
Afternoon	38361
Dawn	4740

3) Evolution of E-commerce orders in the Brazil region:

1. **Get month on month orders by states**
2. **Distribution of customers across the states in Brazil**

Get month on month orders by states

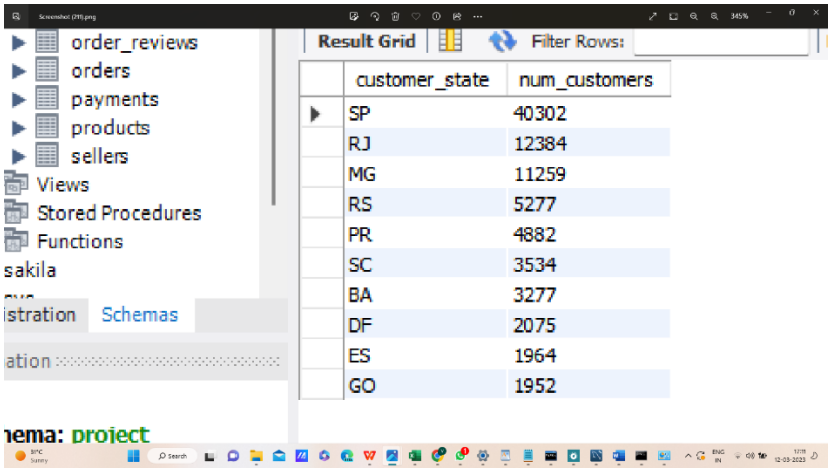
```
select
  date_format (order_purchase_timestamp, '%Y-%m') AS month,
  customer_state,
  count(*) AS num_orders
from
  orders o
  join customers c ON o.customer_id = c.customer_id
group by
  month,
  customer_state
order by
  month,
  customer_state;
```



month	customer_state	num_orders
2016-09	RR	1
2016-09	RS	1
2016-09	SP	2
2016-10	AL	2
2016-10	BA	4
2016-10	CE	8
2016-10	DF	6
2016-10	ES	4
2016-10	GO	9
2016-10	MA	4

-- 2)Distribution of customers across the states in Brazil

```
select
  customer_state,
  count(distinct customer_unique_id) AS num_customers
from
  customers
group by
  customer_state
order by
  num_customers desc;
```

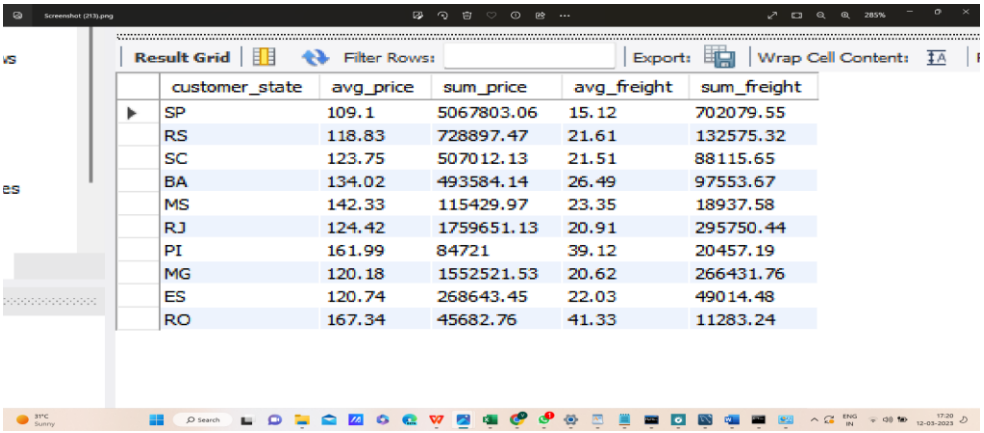


customer_state	num_customers
SP	40302
RJ	12384
MG	11259
RS	5277
PR	4882
SC	3534
BA	3277
DF	2075
ES	1964
GO	1952

4) **Impact on Economy: Analyze the money movement by e-commerce by looking at order prices, freight and others.**
   a. **Get % increase in cost of orders from 2017 to 2018 (include months between Jan to Aug only) - You can use "payment_value" column in payments table**
   b. **Mean & Sum of price and freight value by customer state**

b) Mean & Sum of price and freight value by customer state

```
select
 c.customer_state,
 round(avg(op.price), 2) AS avg_price,
 round(sum(op.price), 2) AS sum_price,
 round(avg(op.freight_value), 2) AS avg_freight,
 round(sum(op.freight_value), 2) AS sum_freight
from order_items op
join orders o on op.order_id = o.order_id
join customers c on o.customer_id = c.customer_id
where o.order_status in ('delivered', 'approved')
group by c.customer_state;
```



customer_state	avg_price	sum_price	avg_freight	sum_freight
SP	109.1	5067803.06	15.12	702079.55
RS	118.83	728897.47	21.61	132575.32
SC	123.75	507012.13	21.51	88115.65
BA	134.02	493584.14	26.49	97553.67
MS	142.33	115429.97	23.35	18937.58
RJ	124.42	1759651.13	20.91	295750.44
PI	161.99	84721	39.12	20457.19
MG	120.18	1552521.53	20.62	266431.76
ES	120.74	268643.45	22.03	49014.48
RO	167.34	45682.76	41.33	11283.24

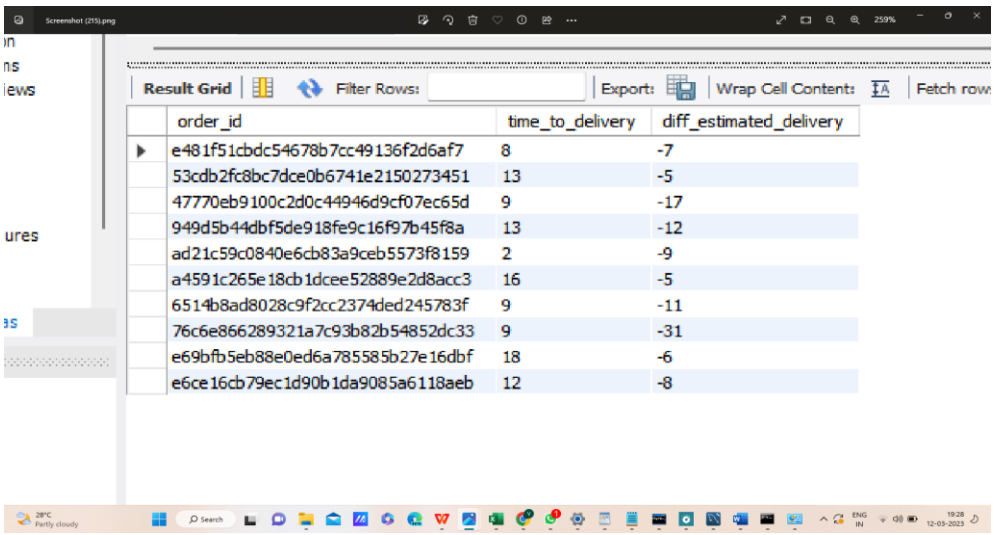
5. Analysis on sales, freight and delivery time

1. **Calculate days between purchasing, delivering and estimated delivery**
2. **Find time_to_delivery & diff_estimated_delivery. Formula for the same given below:**
   - **time_to_delivery = order_purchase_timestamp-order_delivered_customer_date**
   - **diff_estimated_delivery = order_estimated_delivery_date-order_delivered_customer_date**
3. **Group data by state, take mean of freight_value, time_to_delivery, diff_estimated_delivery**
4. **Sort the data to get the following:**
5. **Top 5 states with highest/lowest average freight value - sort in desc/asc limit 5**
6. **Top 5 states with highest/lowest average time to delivery**
7. **Top 5 states where delivery is really fast/ not so fast compared to estimated date**

2(1)time_to_delivery = order_purchase_timestamp-order_delivered_customer_date

2(2)diff_estimated_delivery = order_estimated_delivery_date-order_delivered_customer_date

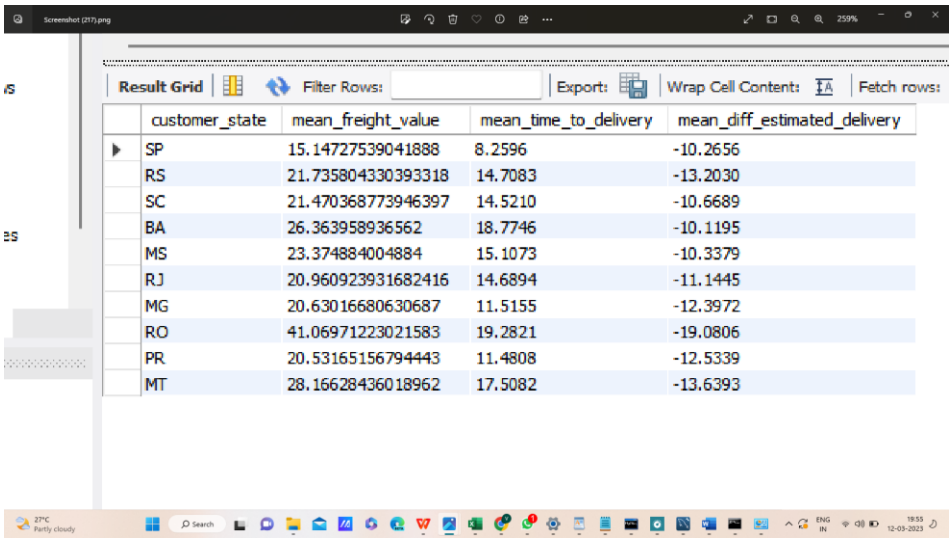
```
select
o.order_id,
   timestampdiff(day, o.order_purchase_timestamp, o.order_delivered_customer_date) as
time_to_delivery,
   timestampdiff(day, o.order_estimated_delivery_date, o.order_delivered_customer_date) as
diff_estimated_delivery
from orders o
where o.order_status = 'delivered';
```



order_id	time_to_delivery	diff_estimated_delivery
e481f51cbdc54678b7cc49136f2d6af7	8	-7
53cdb2fc8bc7dce0b6741e2150273451	13	-5
47770eb9100c2d0c44946d9cf07ec65d	9	-17
949d5b44dbf5de918fe9c16f97b45f8a	13	-12
ad21c59c0840e6cb83a9ceb5573f8159	2	-9
a4591c265e18cb1dcee52889e2d8acc3	16	-5
6514b8ad8028c9f2cc2374ded245783f	9	-11
76c6e866289321a7c93b82b54852dc33	9	-31
e69bfb5eb88e0ed6a785585b27e16dbf	18	-6
e6ce16cb79ec1d90b1da9085a6118aeb	12	-8

Group data by state, take mean of freight_value, time_to_delivery, diff_estimated_delivery

```
select c.customer_state,
    avg(oi.freight_value) as   mean_freight_value,
    avg(timestampdiff(DAY, o.order_purchase_timestamp,
o.order_delivered_customer_date)) as mean_time_to_delivery,
    avg(timestampdiff(DAY, o.order_estimated_delivery_date,
o.order_delivered_customer_date)) as mean_diff_estimated_delivery
from orders o
join customers c on o.customer_id = c.customer_id
join order_items oi on o.order_id = oi.order_id
group by c.customer_state;
```

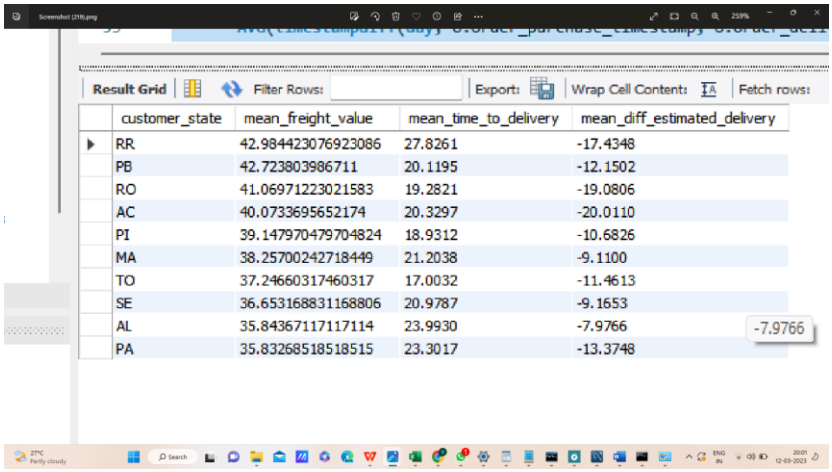


Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

customer_state	mean_freight_value	mean_time_to_delivery	mean_diff_estimated_delivery
SP	15.14727539041888	8.2596	-10.2656
RS	21.735804330393318	14.7083	-13.2030
SC	21.470368773946397	14.5210	-10.6689
BA	26.363958936562	18.7746	-10.1195
MS	23.374884004884	15.1073	-10.3379
RJ	20.960923931682416	14.6894	-11.1445
MG	20.63016680630687	11.5155	-12.3972
RO	41.06971223021583	19.2821	-19.0806
PR	20.53165156794443	11.4808	-12.5339
MT	28.16628436018962	17.5082	-13.6393

4)Sort the data to get the following:

```
select
 c.customer_state,
    avg(oi.freight_value) as mean_freight_value,
    avg(timestampdiff(day, o.order_purchase_timestamp, o.order_delivered_customer_date)) as
mean_time_to_delivery,
    AVG(timestampdiff(day, o.order_estimated_delivery_date, o.order_delivered_customer_date))
as mean_diff_estimated_delivery
from orders o
join customers c on o.customer_id = c.customer_id
join order_items oi on o.order_id = oi.order_id
group by c.customer_state
order by mean_freight_value desc, mean_time_to_delivery asc;
```



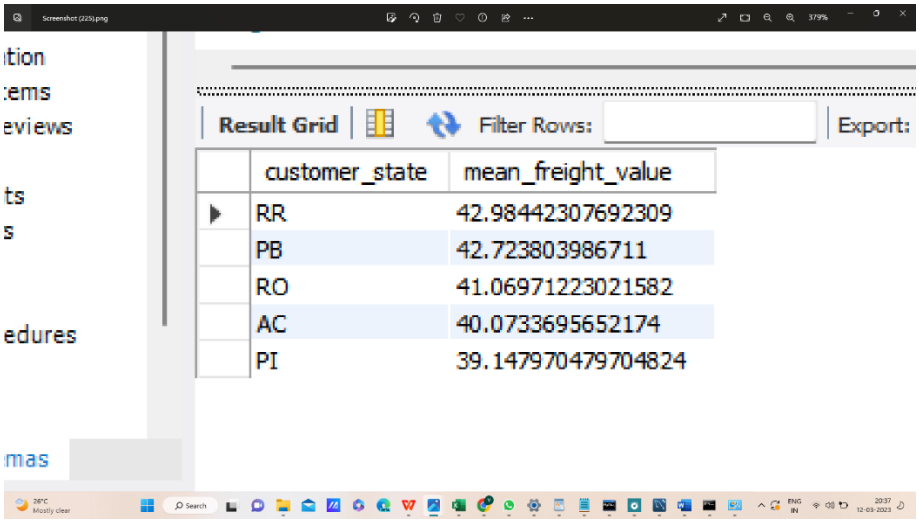
Result Grid | Filter Rows: | Export: | Wrap Cell Content: | Fetch rows:

customer_state	mean_freight_value	mean_time_to_delivery	mean_diff_estimated_delivery
RR	42.984423076923086	27.8261	-17.4348
PB	42.723803986711	20.1195	-12.1502
RO	41.06971223021583	19.2821	-19.0806
AC	40.0733695652174	20.3297	-20.0110
PI	39.147970479704824	18.9312	-10.6826
MA	38.25700242718449	21.2038	-9.1100
TO	37.24660317460317	17.0032	-11.4613
SE	36.653168831168806	20.9787	-9.1653
AL	35.84367117117114	23.9930	-7.9766
PA	35.83268518518515	23.3017	-13.3748

-7.9766

5)Top 5 states with highest/lowest average freight value - sort in desc/asc limit 5

```
select c.customer_state,
    avg(oi.freight_value) as mean_freight_value
from orders o
join customers c on o.customer_id = c.customer_id
join order_items oi on o.order_id = oi.order_id
group by  c.customer_state
order by mean_freight_value DESC
limit 5;
```



Result Grid | Filter Rows: | Export:

customer_state	mean_freight_value
RR	42.98442307692309
PB	42.723803986711
RO	41.06971223021582
AC	40.0733695652174
PI	39.147970479704824

lowest average freight value

```
select c.customer_state,
    avg(oi.freight_value) as mean_freight_value
from orders o
join customers c on o.customer_id = c.customer_id
join order_items oi on o.order_id = oi.order_id
group by c.customer_state
order by mean_freight_value asc
limit 5;
```

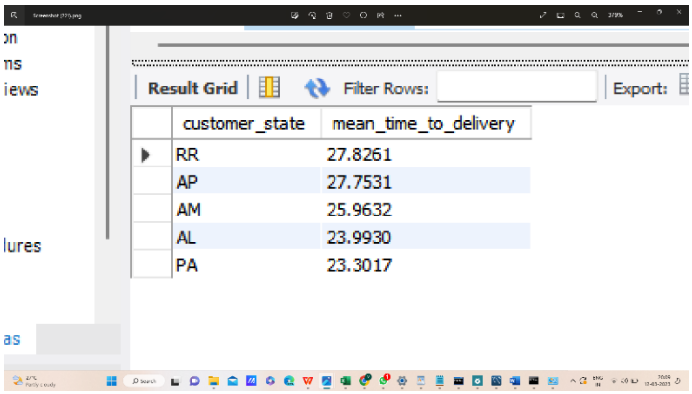
Screenshot (227).png

Result Grid | Filter Rows: | Export

customer_state	mean_freight_value
SP	15.147275390418894
PR	20.53165156794443
MG	20.630166806306885
RJ	20.960923931682423
DF	21.041354945968347

6)Top 5 states with highest/lowest average time to delivery

```
select c.customer_state,
    avg(timestampdiff(day, o.order_purchase_timestamp, o.order_delivered_customer_date)) AS
mean_time_to_delivery
from orders o
join customers c on o.customer_id = c.customer_id
join order_items oi on o.order_id = oi.order_id
group by c.customer_state
order by mean_time_to_delivery desc
limit 5;
```

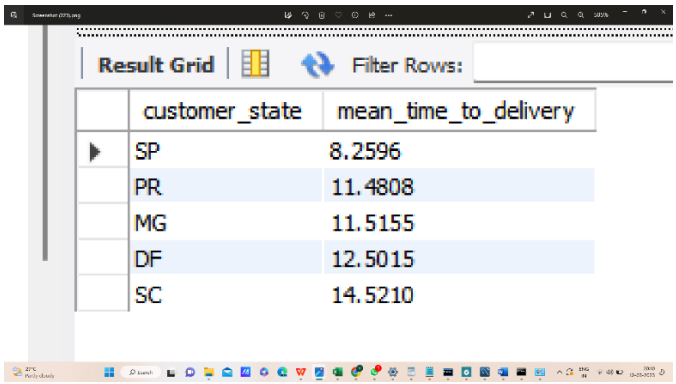


Result Grid | Filter Rows: | Export:

customer_state	mean_time_to_delivery
RR	27.8261
AP	27.7531
AM	25.9632
AL	23.9930
PA	23.3017

-- lowest average time to delivery

```
select c.customer_state,
    avg(timestampdiff(day, o.order_purchase_timestamp, o.order_delivered_customer_date)) AS
mean_time_to_delivery
from orders o
join customers c on o.customer_id = c.customer_id
join order_items oi on o.order_id = oi.order_id
group by c.customer_state
order by mean_time_to_delivery asc
limit 5;
```

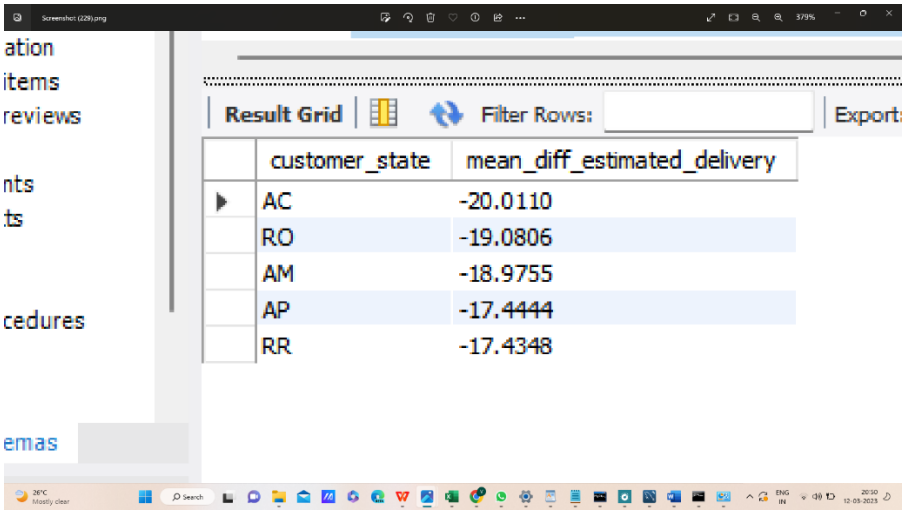


Result Grid | Filter Rows:

customer_state	mean_time_to_delivery
SP	8.2596
PR	11.4808
MG	11.5155
DF	12.5015
SC	14.5210

7)Top 5 states where delivery is really fast/ not so fast compared to estimated date

```
Select c.customer_state,
     avg(timestampdiff(day, o.order_estimated_delivery_date, o.order_delivered_customer_date))
as mean_diff_estimated_delivery
from orders o
join customers c on o.customer_id = c.customer_id
join order_items oi on o.order_id = oi.order_id
group by c.customer_state
having mean_diff_estimated_delivery < 0
order BY mean_diff_estimated_delivery ASC
limit 5;
```



customer_state	mean_diff_estimated_delivery
AC	-20.0110
RO	-19.0806
AM	-18.9755
AP	-17.4444
RR	-17.4348

6. Payment type analysis:

1. **Month over Month count of orders for different payment types**
2. **Count of orders based on the no. of payment instalments**

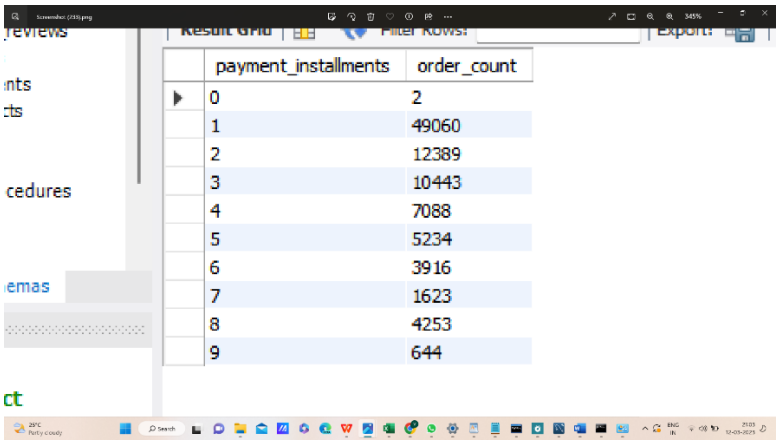
6(1) Month over Month count of orders for different payment types

```
 select
 Year(o.order_purchase_timestamp) as year,
 month(o.order_purchase_timestamp) as month,
 p.payment_type,
 count(distinct o.order_id) as order_count
from
 payments p
 join orders o on p.order_id = o.order_id
group by
 year(o.order_purchase_timestamp),
 month(o.order_purchase_timestamp),
 p.payment_type;
```

year	month	payment_type	order_count
2016	9	credit_card	3
2016	10	credit_card	253
2016	10	debit_card	2
2016	10	UPI	63
2016	10	voucher	11
2016	12	credit_card	1
2017	1	credit_card	582
2017	1	debit_card	9
2017	1	UPI	197
2017	1	voucher	33

6(2)Count of orders based on the no. of payment instalments

```
 select
 p.payment_installments,
 count(distinct o.order_id) as order_count
from
 payments p
 join orders o on p.order_id = o.order_id
group by
 p.payment_installments
```



payment_installments	order_count
0	2
1	49060
2	12389
3	10443
4	7088
5	5234
6	3916
7	1623
8	4253
9	644