Project
Target- An Online and In-Store

Context

Target stands as one of the globally renowned American retail corporations that extensively offers, both online and in-store, everything from groceries and essential items to clothing and electronics. Opt for convenient and contactless options such as pickup or delivery for a seamless shopping experience. Shop with Target today for all your needs in the United States.

Visit the online store: Expect more, Pay Less

This business case encompasses data from 100,000 orders spanning the years 2016 to 2018, reflecting transactions conducted at Target in Brazil. The dataset encompasses diverse dimensions, allowing a comprehensive view of orders, encompassing aspects such as order status, pricing, payment and freight performance, customer locations, product attributes, and customer reviews.

1. **Import the dataset and do the usual exploratory analysis steps like checking the structure and characteristics of the dataset.**
    a. The data type of columns in a table
    b. The time period for which the data is given
    c. Cities and states of customers ordered during the given period

    Explanation of dataset:

    In this dataset, there are 8 tables given by name:

    a. customers.csv
    b. sellers.csv
    c. order_item.csv
    d. geolocation.csv
    e. payments.csv
    f. reviews.csv
    g. orders.csv
    h. products.csv

1. **Data type of all columns in the "customers" table.**
    a. **Explanation:** To check the data type of any table using BigQuery, Double-click on the table's name, which is mentioned on the left side under the dataset ‘target’. On the right side, we can check the data types of all columns.
    b. **Screenshot of the result:**

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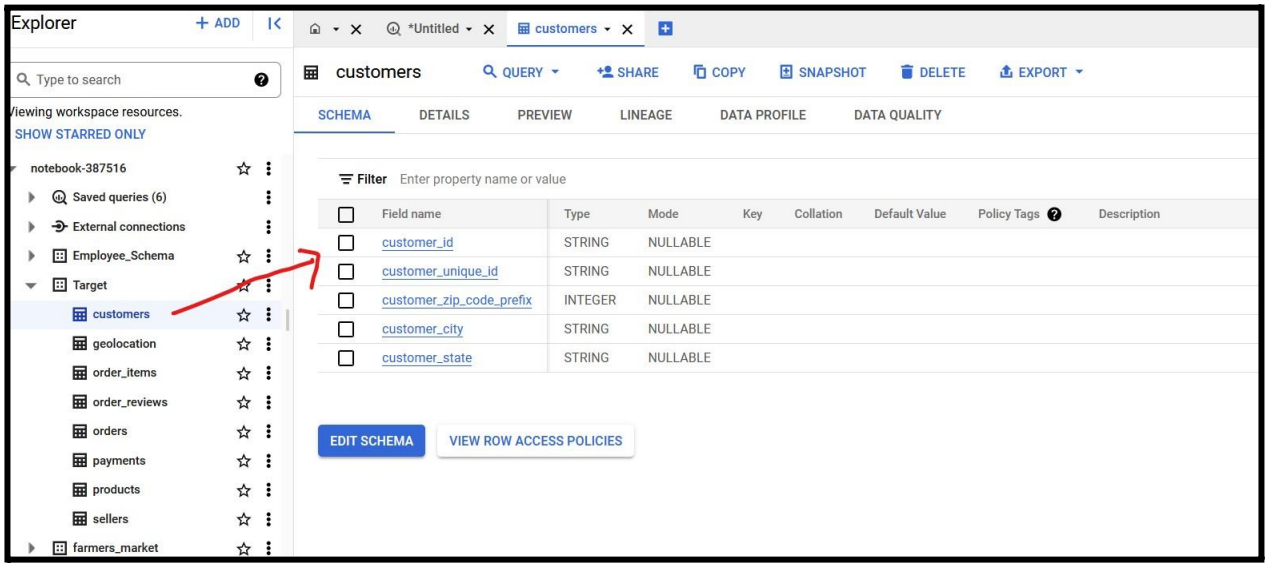
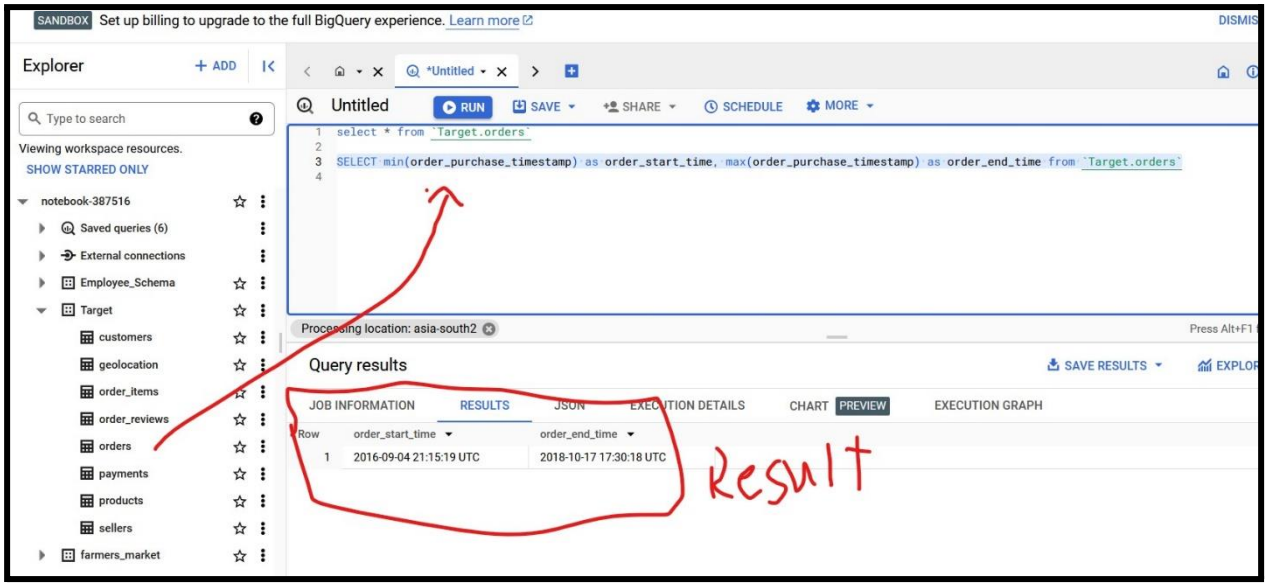


2. Time range between which the orders were placed
    a. **Explanation:** To find the time range, we will look for the table name 'order' in which we already have 'order_purchase_timestamp' col - time range here means the day and time when the first order was placed and the last day when the order was placed. Using the Avg function Max and Min will give us the time range - the ideal option when the data type is in the format of date/time.
    b. **Analysis:** Analyzing the provided information can provide actionable insights for improving operational efficiency, enhancing customer experience, and tailoring marketing strategies to align with customer behavior patterns over time.
    c. **Query**: SELECT min(order_purchase_timestamp) as order_start_time, max(order_purchase_timestamp) as order_end_time from `Target.orders`
    d. **Screenshot of the result:**



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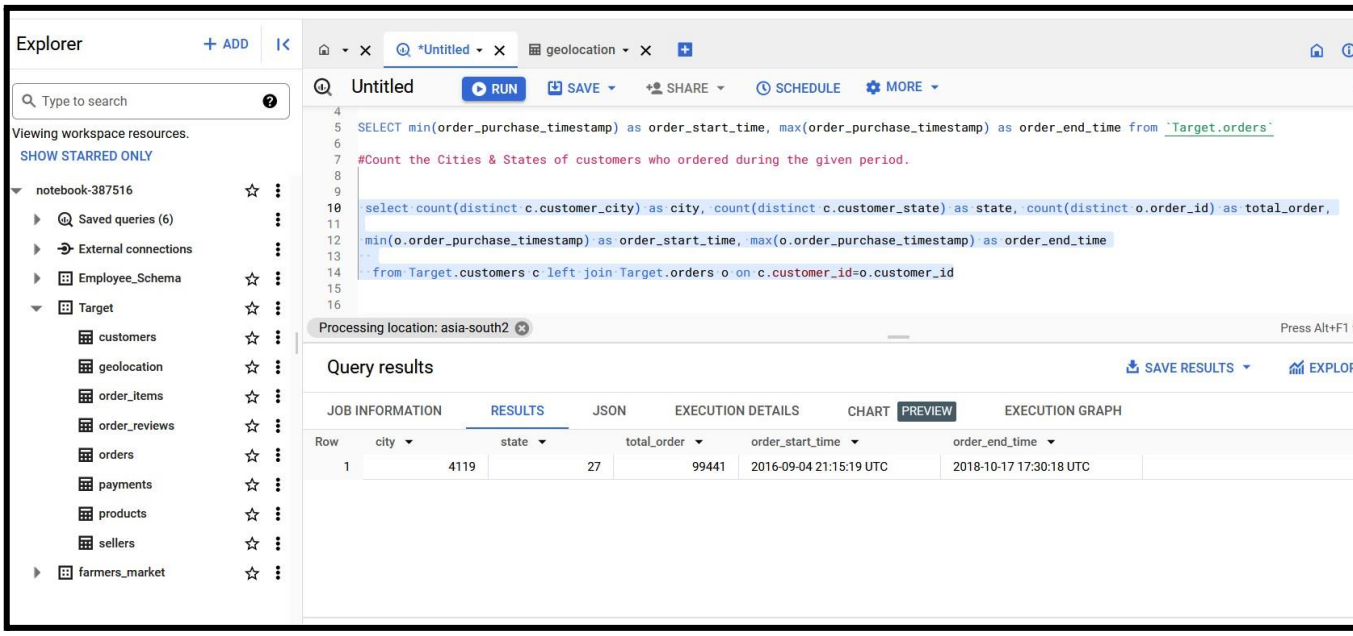
3. Counting the Cities & States of customers who ordered during the given period.
   a. **Explanation:** Here, we have found out all orders placed from total cities and states in the given time range, which we have above - in this query, we have used aggregate functions like count, min, max, and left join because we have to find out all orders placed by customers.
   b. **Analysis:** The analysis based on the provided information offers insights into the geographical distribution of orders, overall order count, and temporal aspects of order placement. These insights are valuable for strategic decision-making, resource allocation, and improving customer-centric operations.
   c. **Query:** select count(distinct c.customer_city) as city, count(distinct c.customer_state) as state, count(distinct o.order_id) as total_order, min(o.order_purchase_timestamp) as order_start_time, max(o.order_purchase_timestamp) as order_end_time from Target.customers c left join Target.orders o on c.customer_id=o.customer_id
   d. **Screenshot of the result:**



4. A growing trend in the no. of orders placed over the past years
   a. **Explanation:** The growing trend here means that with time, there is an increase in total orders. Now that we know that we have to show total orders we focus on time, which is in question in years - means (2016, 2017, 2018 …n).
   b. **Analysis:** The analysis based on the provided query offers insights into the temporal dynamics of order volume, allowing businesses to make data-driven decisions related to inventory management, marketing planning, and overall business strategy.
   c. **Query:** select Extract(year from order_purchase_timestamp) as years_count, count(order_id) as order_count from Target.orders group by years_count order by

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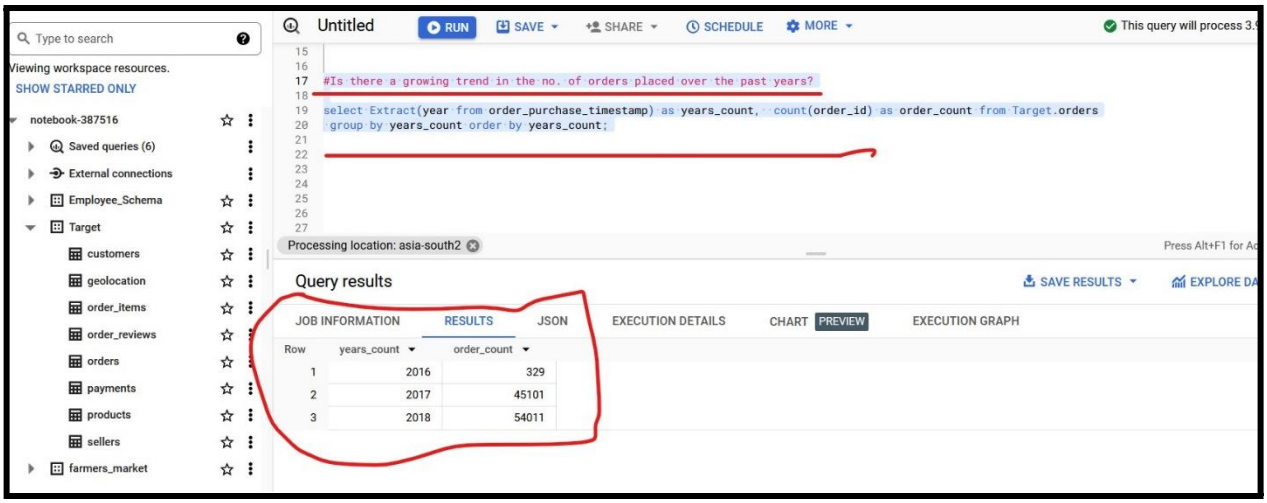
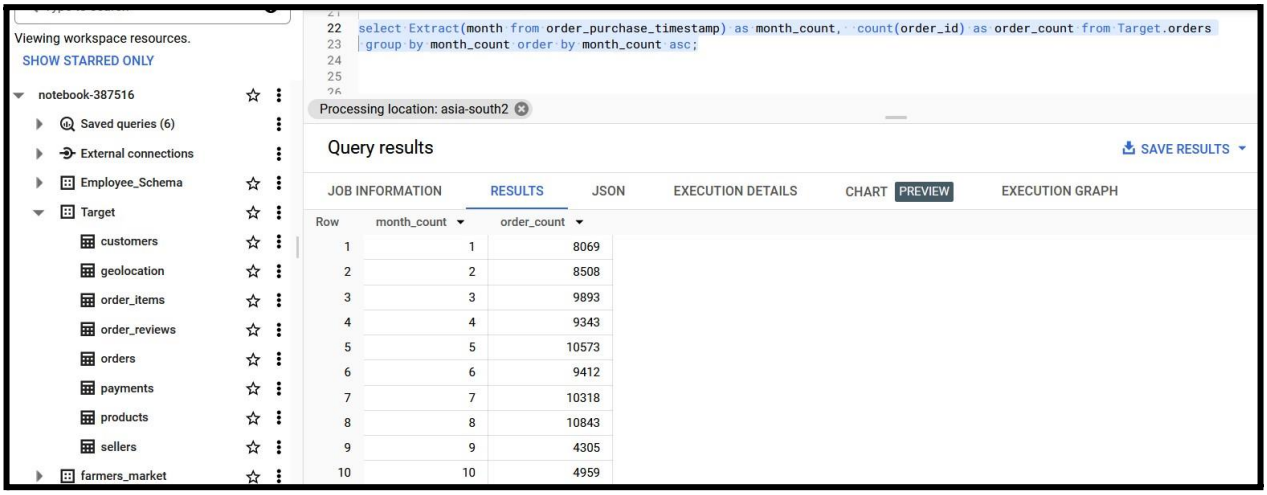
years_count;

d. **Screenshot of the result:**



5. Monthly seasonality in terms of the no. of orders being placed.
    a. **Explanation:** The provided information will extract information about the monthly seasonality of order placements.
    b. **Analysis:** The analysis based on the provided information will offer a detailed view of monthly seasonality regarding order counts. This information empowers businesses to adapt their strategies, optimize operations, and enhance customer experiences in alignment with the cyclical patterns observed throughout the year.
    c. **Query:** select Extract(month from order_purchase_timestamp) as month_count, count(order_id) as order_count from Target.orders group by month_count order by month_count asc;

    d. **Screenshot of the result:**



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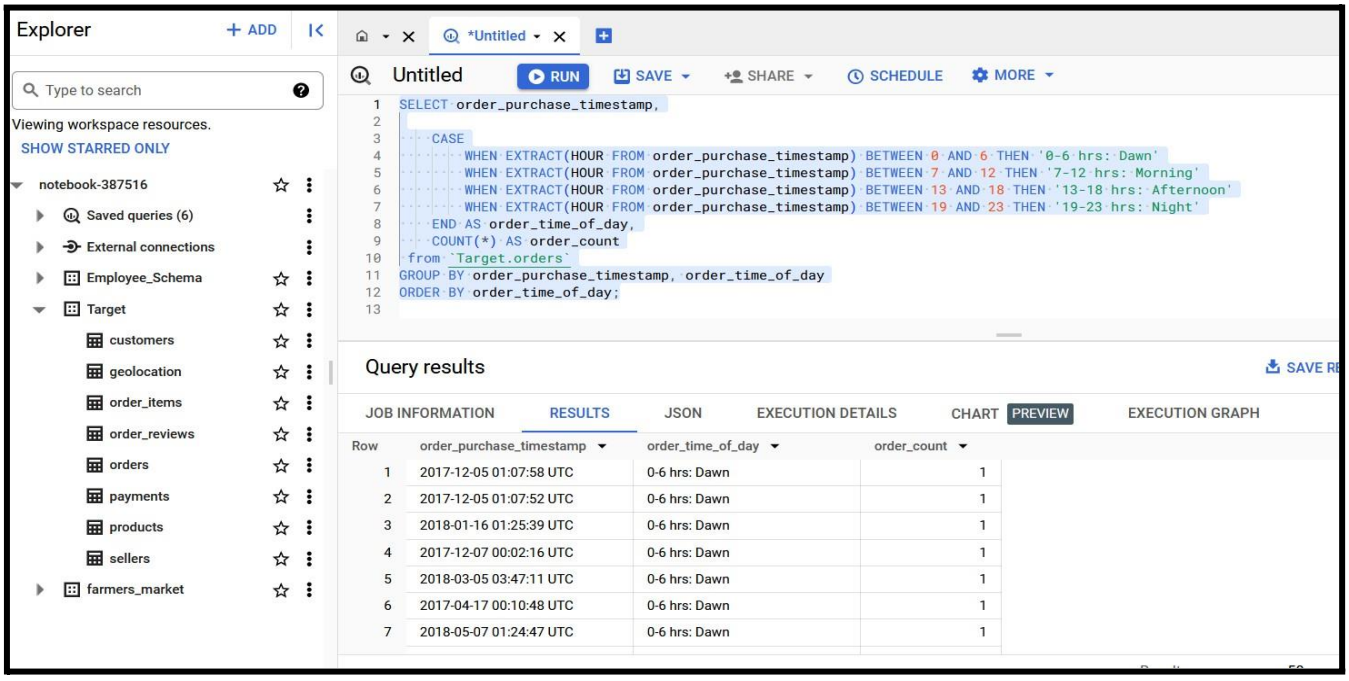
6. What time of the day do the Brazilian customers place their orders? (Dawn, Morning, Afternoon or Night)
    a. **Explanation:** Here, we will segregate the data by the range that we can use the 'Case' condition, which will segregate the data into 4 sections: 'Dawn', 'Morning', 'Afternoon' and 'Night'; we will also count the total orders placed by the customers for each section segregation this is where group by roles come into the play. Also, we could use the where clause with the country as 'Brazil', but we assume that the complete data is of a "Brazil" country.
    b. **Analysis:** the analysis based on the provided query offers valuable insights into the temporal distribution of orders, allowing businesses to make data-driven decisions related to operational efficiency, resource allocation, and targeted marketing strategies aligned with customer behaviour patterns throughout the day.
    c. **Query:** SELECT order_purchase_timestamp,
    CASE
    WHEN EXTRACT(HOUR FROM order_purchase_timestamp) BETWEEN 0 AND 6 THEN '0-6 hrs: Dawn'
    WHEN EXTRACT(HOUR FROM order_purchase_timestamp) BETWEEN 7 AND 12 THEN '7-12 hrs: Morning'
    WHEN EXTRACT(HOUR FROM order_purchase_timestamp) BETWEEN 13 AND 18 THEN '13-18 hrs: Afternoon'
    WHEN EXTRACT(HOUR FROM order_purchase_timestamp) BETWEEN 19 AND 23 THEN '19-23 hrs: Night'
    END AS order_time_of_day,
    COUNT(*) AS order_count from `Target.orders`
    GROUP BY order_purchase_timestamp, order_time_of_day ORDER BY order_time_of_day;
    d. **Screenshot of the result**



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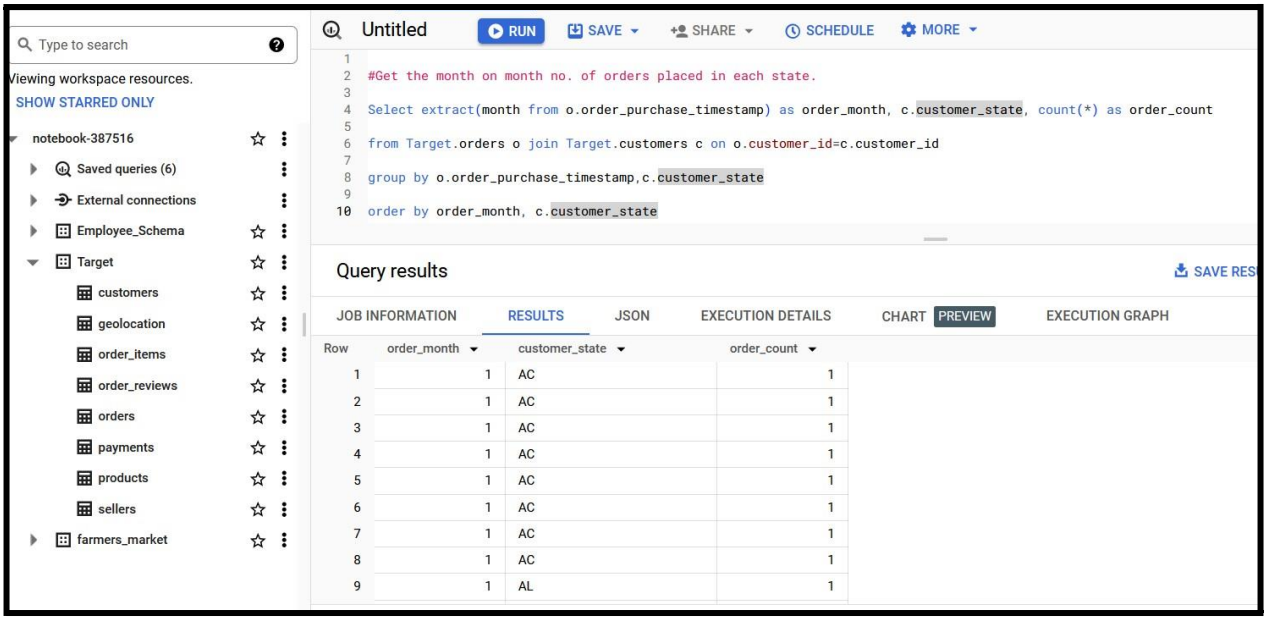
7. Month-on-month number of orders placed in each state.
    a. **Explanation:** As mentioned, we require month-by-month (1,2,3,4, n) orders placed for each state. In this, we will use the customer and order table to collect states and total order count using left join. The key point here is to extract data by month and in the "order_purchased_timestamp." The month is not available separately so that we will extract all months.
    b. **Analysis:** The analysis is based on the provided query that offers a detailed view of order counts, allowing businesses to make informed decisions related to regional strategies, marketing campaigns, and operational efficiency based on both temporal and geographical considerations.
    c. **Query:** Select extract(month from o.order_purchase_timestamp) as order_month, c.customer_state, count(*) as order_count from Target.orders o join Target.customers c on o.customer_id=c.customer_id group by o.order_purchase_timestamp,c.customer_state order by order_month, c.customer_state
    d. **Screenshot of the result:**



8. Customers are distributed across all the states.
    a. **Explanation:** Customer distribution across all the states means we have to find and count the total unique customers for each state.
    b. **Analysis:** The analysis based on the provided query offers a comprehensive view of customer distribution across states, enabling businesses to make data-driven decisions for market expansion, customer engagement, and strategic planning.
    c. **Query:** SELECT distinct customer_state, COUNT(customer_unique_id) AS toal_customer FROM Target.customers GROUP BY customer_state ORDER BY customer_state;
    d. **Screenshot of the result:**

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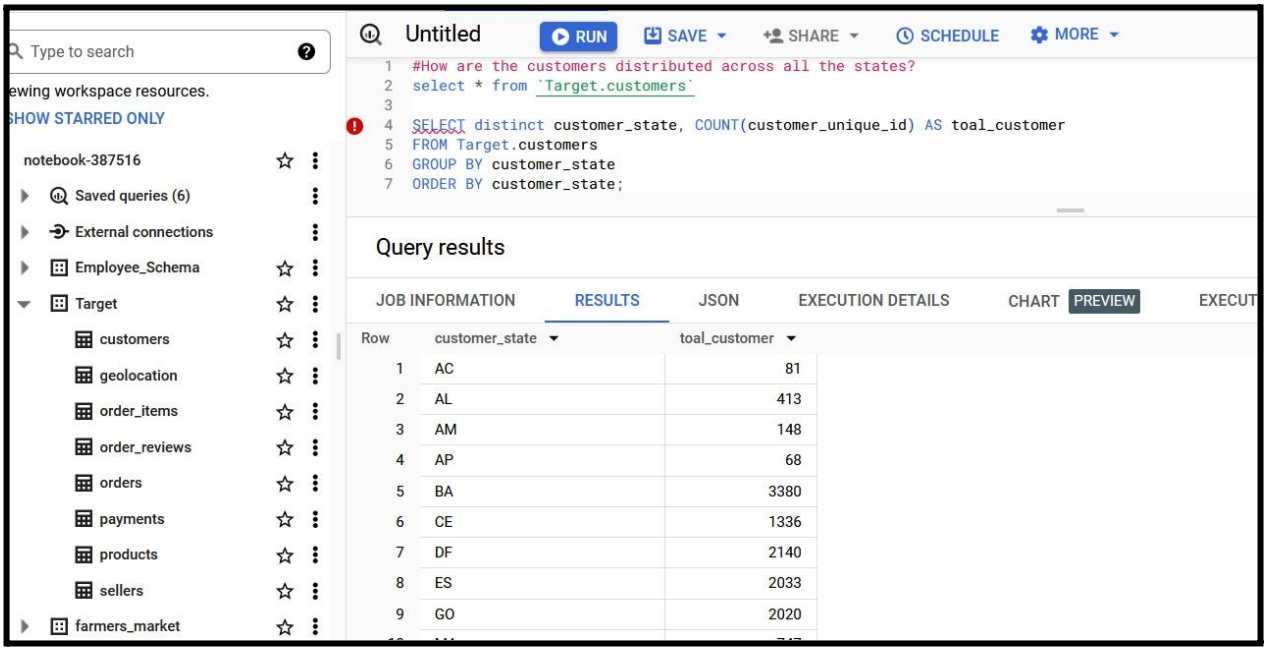

9. Getting the % increase in the cost of orders from 2017 to 2018 (include months between Jan to Aug only). You can use the "payment_value" column in the payments table to get the cost of orders.
    a. **Explanation:** The provided information will calculate the percentage increase in the cost of orders from 2017 to 2018, considering the months from January to August only. The analysis is based on the "payment_value" column in the "payments" table.
    b. **Analysis:** The analysis offers insights into the percentage increase in the cost of orders from 2017 to 2018, emphasizing the months between January and August. It is a valuable metric for evaluating financial growth and identifying potential areas for further investigation or improvement.
    c. **Query:** With MonthlyPayments as (select o.order_id, Extract(year from o.order_purchase_timestamp) as order_year, Extract(Month from o.order_purchase_timestamp) as order_month, Sum(P.payment_value) as total_payment from Target.orders o Join Target.payments p on o.order_id=p.order_id where extract(year from o.order_purchase_timestamp) In (2017, 2018) and extract(month from o.order_purchase_timestamp) between 1 and 8 Group by o.order_id, extract (year from o.order_purchase_timestamp), extract(month from o.order_purchase_timestamp)) SELECT (SUM(CASE WHEN order_year = 2018 THEN total_payment ELSE 0 END) - SUM(CASE WHEN order_year = 2017 THEN total_payment ELSE 0 END)) / SUM(CASE WHEN order_year = 2017 THEN total_payment ELSE 0 END) 100 AS percentage_increase FROM MonthlyPayments WHERE order_year IN (2017, 2018) GROUP BY order_year;

10. Calculating the Total & Average value of the order price for each state.
    a. **Explanation:** In this problem, there will be three tables will be engaged which are 'Customers' from which we will get each state, 'Orders' orders table will give us the order_id for which we will find out the total sum and avg of the price from the table 'Payment.'

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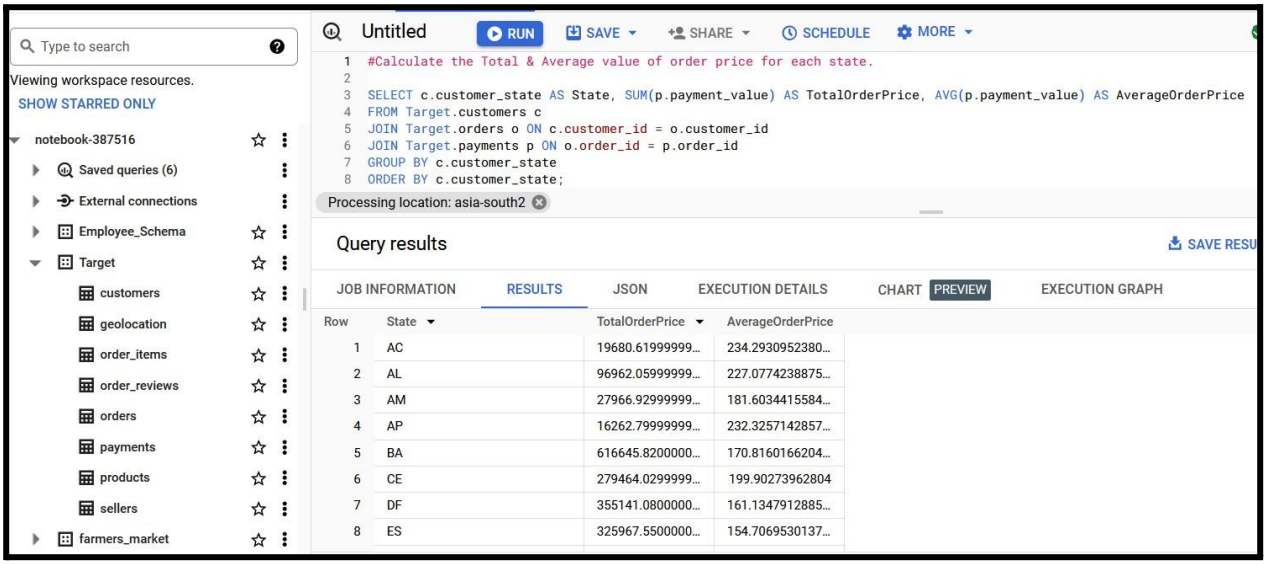
b. **Analysis:** The information provides valuable insights into the finding patterns of customers in different states, helping businesses make informed decisions related to marketing, operations, and customer engagement strategies.
c. **Query:** SELECT c.customer_state AS State, SUM(p.payment_value) AS TotalOrderPrice, AVG(p.payment_value) AS AverageOrderPrice FROM Target.customers c JOIN Target.orders o ON c.customer_id = o.customer_id JOIN Target.payments p o.order_id = p.order_id GROUP BY c.customer_state ORDER BY c.customer_state;
d. **Screenshot of the result**



Conclusion for "Target" - An E-commerce and In-store American Corporation:

Based on the provided analysis, queries, and explanations, several conclusions can be drawn regarding Target, an American e-commerce and in-store corporation:

1. **Geographical distribution and market presence**: Target is a recognised brand and leading retailer in the United States, maintaining a significant online and physical market presence. To reach maximum users in local markets, 'target' can customise products depending on the geo-location. For example, the company could target students in schools and colleges if they have a range of amazing t-shirts, school/college bags, shoes, etc.
2. **Order dynamics and seasonal trends:** The Company comprehensively understands its order dynamics, utilizing advanced data analysis techniques to identify trends and patterns in customer behaviour. Seasonal trends, monthly seasonality, and yearly growth are analysed to optimize operations and marketing strategies.
3. **Customer engagement and regional variation:** Target employs customer-centric strategies, tailoring marketing efforts based on regional customer engagement patterns. Analysing customer distribution across states provides insights into regional variations in customer behavior.

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4. Operational efficiency and resource allocation: The Company is committed to operational efficiency, utilizing data analysis to optimise resource allocation, staffing levels, and inventory management. The segmentation of orders by time of day allows for strategic planning and operational optimization during peak hours.

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Q.4. Answer.c

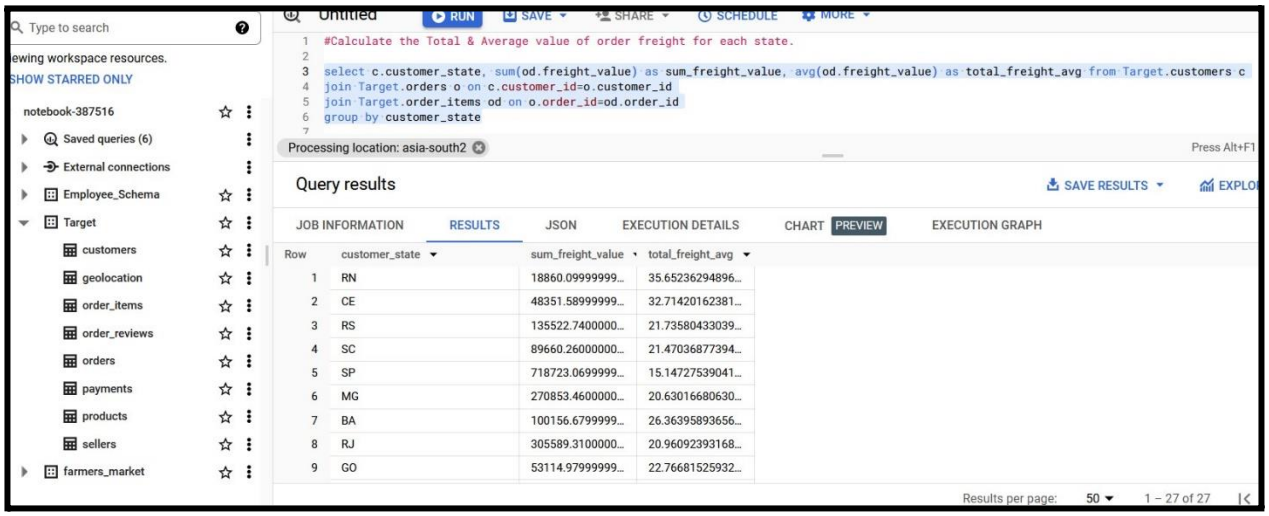
Query

```
select c.customer_state, sum(od.freight_value) as sum_freight_value, avg(od.freight_value) as
total_freight_avg from Target.customers c
join Target.orders o on c.customer_id=o.customer_id
join Target.order_items od on o.order_id=od.order_id
group by customer_state
```

Explanation:

Just like the above question, in this problems also, we will use three tables ‘Customers’, ‘Order_items’ and ‘Orders’ - Frieght_value can be calculated using the table order_items although to connect with order_items we will use ‘order_id’ which is a common col for both tables “order_items’ and ‘Orders’ and result for each state ‘Customer table’ we will use group by.

Screenshot



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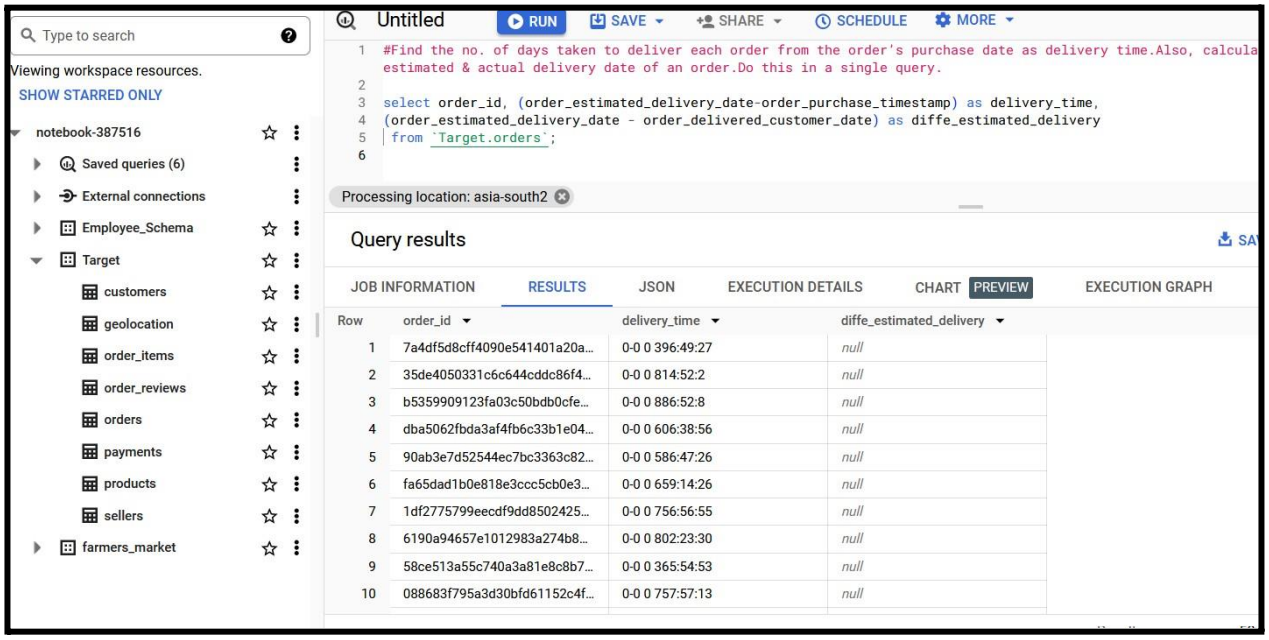
Q.5. answer.1.

Query:

```
select order_id, (order_estimated_delivery_date-order_purchase_timestamp) as
delivery_time,
(order_estimated_delivery_date - order_delivered_customer_date) as
diffe_estimated_delivery
 from `Target.orders`;
```

Screenshot



Q.5.Answer.b.

Query

```
SELECT c.customer_state, AVG(oi.freight_value) AS avg_freight_value
FROM customers AS c
JOIN orders AS o
ON c.customer_id = o.customer_id
JOIN order_items AS oi
ON o.order_id = oi.order_id
GROUP BY c.customer_state
ORDER BY avg_freight_value DESC
LIMIT 5

UNION ALL
```

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```
SELECT c.customer_state,AVG(oi.freight_value) AS avg_freight_value
FROM customers AS c
JOIN orders AS o
ON c.customer_id = o.customer_id
JOIN order_items AS oi
ON o.order_id = oi.order_id
GROUP BY c.customer_state
ORDER BY avg_freight_value ASC
LIMIT 5;
```

This query gave me error everytime -

Q.5.c
Query

```
SELECT
    c.customer_state,
    AVG(DATEDIFF(order_delivered_customer_date, order_purchase_timestamp)) AS
avg_delivery_time
FROM
    customers AS c
JOIN
    orders AS o
ON
    c.customer_id = o.customer_id
GROUP BY
    c.customer_state
ORDER BY
    avg_delivery_time DESC
LIMIT 5

UNION ALL

SELECT
    c.customer_state,
    AVG(DATEDIFF(order_delivered_customer_date, order_purchase_timestamp)) AS
avg_delivery_time
FROM
    customers AS c
JOIN
    orders AS o
ON
```

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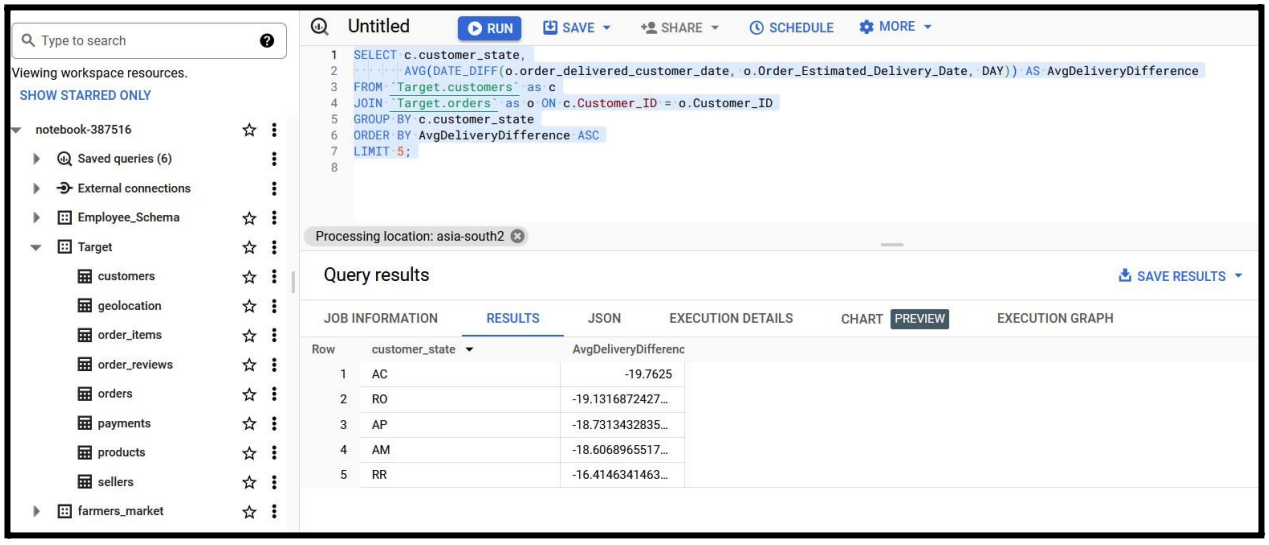
```
    c.customer_id = o.customer_id
GROUP BY
    c.customer_state
ORDER BY
    avg_delivery_time ASC
LIMIT 5;
```

Q.4. Answer.c.
Query

```
SELECT c.customer_state,
        AVG(DATE_DIFF(o.order_delivered_customer_date, o.Order_Estimated_Delivery_Date,
DAY)) AS AvgDeliveryDifference
FROM `Target.customers` as c
JOIN `Target.orders` as o ON c.Customer_ID = o.Customer_ID
GROUP BY c.customer_state
ORDER BY AvgDeliveryDifference ASC
LIMIT 5;
```

Screenshot



Q.5. Answer.1.
Query

```
SELECT
  EXTRACT(YEAR FROM o.Order_purchase_timestamp) AS Year, EXTRACT(MONTH FROM
o.Order_purchase_timestamp) AS Month,
  p.Payment_Type, COUNT(o.Order_ID) AS NumberOfOrders
FROM `Target.orders` o
JOIN `Target.payments` as p
```

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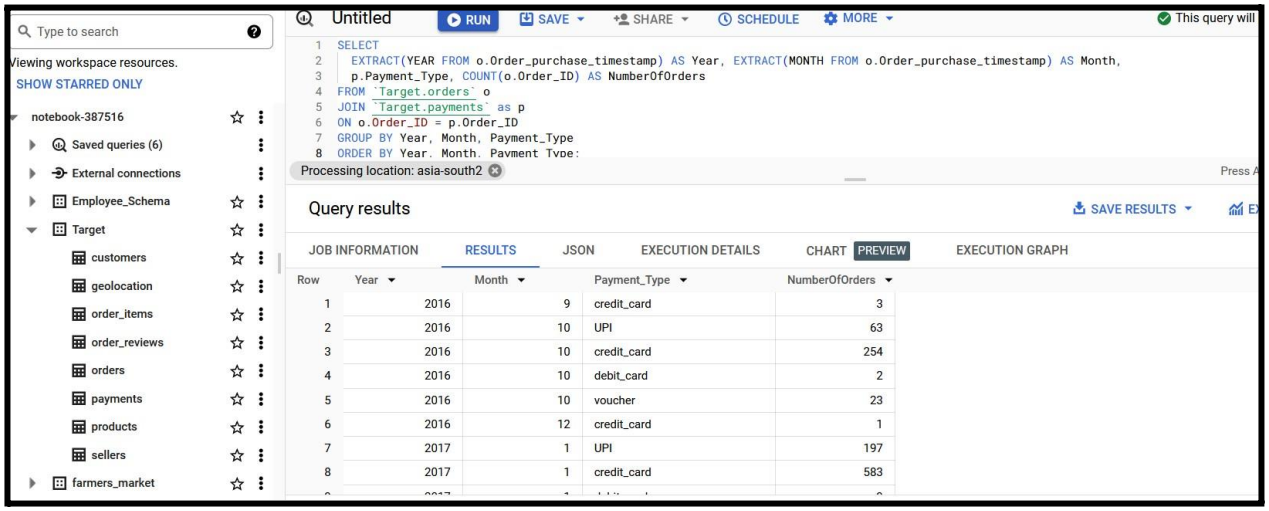
ON o.Order_ID = p.Order_ID
GROUP BY Year, Month, Payment_Type
ORDER BY Year, Month, Payment_Type;

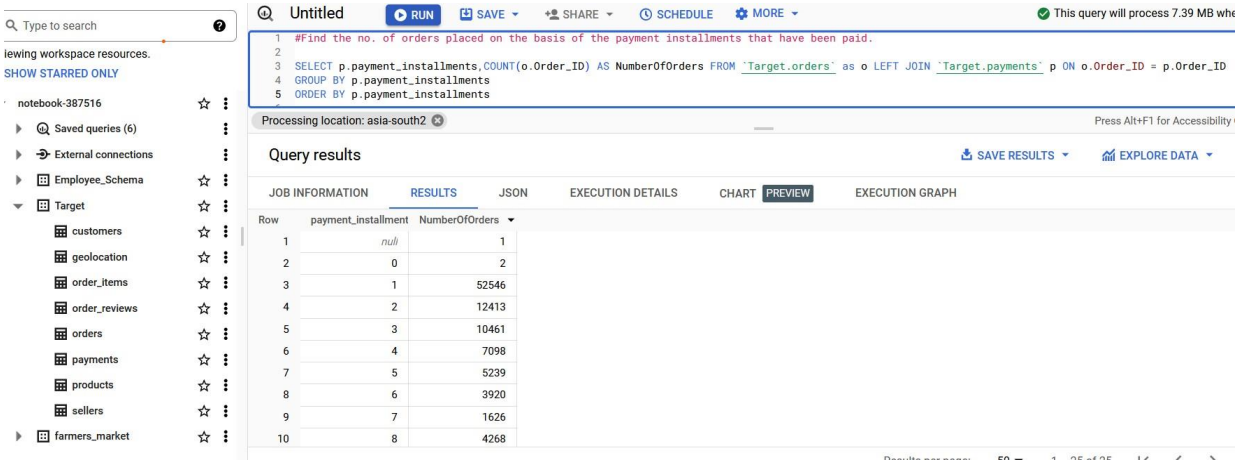
Explanation
As asked in the question, we will use 'extract' years and month from the table orders and in order to find payment type we will use 'Payment' table and use the inner join to connect both tables using 'order_id' because month we have to find on month no. of orders placed.

Screenshot



Question.5.Answer.2
Query
SELECT p.payment_installments,COUNT(o.Order_ID) AS NumberOfOrders FROM `Target.orders` as o LEFT JOIN `Target.payments` p ON o.Order_ID = p.Order_ID
GROUP BY p.payment_installments
ORDER BY p.payment_installments

Screenshot



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Valuable Insights

- [ ] Here we have the range of all orders placed and purchased, this customized data can help 'Target' to understand the historical time of business operations. Also, this data will also help understanding in what hours the company should be proactive when it comes to showcase customized products to the users of brazil.

- [ ] From this result, we could do extensive research on how many users from all cities are purchasing and how the purchasing values of users could be enhanced.

- [ ] These timestamps can be used to calculate various performance metrics, such as the average order frequency or the total number of orders within the specified time frame.