Target SQL Business Case

❖ **Topic:** SQL
❖ **Duration:** 1 week

Why this case study?

From company's perspective:

- Target is a globally renowned brand and a prominent retailer in the United States. Target makes itself a preferred shopping destination by offering outstanding value, inspiration, innovation and an exceptional guest experience that no other retailer can deliver.

- This particular business case focuses on the operations of Target in Brazil and provides insightful information about 100,000 orders placed between 2016 and 2018. The dataset offers a comprehensive view of various dimensions including the order status, price, payment and freight performance, customer location, product attributes, and customer reviews.

- By analyzing this extensive dataset, it becomes possible to gain valuable insights into Target's operations in Brazil. The information can shed light on various aspects of the business, such as order processing, pricing strategies, payment and shipping efficiency, customer demographics, product characteristics, and customer satisfaction levels.

From learner's perspective:

- Solving this business case holds immense importance for aspiring data analysts and scientists.

- SQL is the backbone of data analysis and management in the modern era. By working through this case study, individuals gain hands-on experience and practical skills in manipulating and querying databases, which are fundamental to extracting insights from large volumes of data.

- Solving this particular case study will help in developing proficiency in constructing complex SQL queries and understanding real-world data scenarios.

- Additionally, it will enhance one's ability to communicate with the stakeholders involved in data-related projects and help the organization take better, data-driven decisions.

Dataset:

The data is available in 8 different csv files:
1. customers.csv
2. geolocation.csv
3. order_items.csv
4. payments.csv
5. reviews.csv
6. orders.csv
7. products.csv
8. sellers.csv

The column description for these csv files is given below.

The customers.csv contain following features:

Features	Description
customer_id	ID of the consumer who made the purchase
customer_unique_id	Unique ID of the consumer
customer_zip_code_prefix	Zip Code of consumer's location
customer_city	Name of the City from where order is made
customer_state	State Code from where order is made (Eg. são paulo - SP)

The geolocations.csv contain following features:

Features	Description
geolocation_zip_code_prefix	First 5 digits of Zip Code
geolocation_lat	Latitude
geolocation_lng	Longitude
geolocation_city	City
geolocation_state	State

The sellers.csv contains following features:

Features	Description
seller_id	Unique ID of the seller registered
seller_zip_code_prefix	Zip Code of the seller's location
seller_city	Name of the City of the seller
seller_state	State Code (Eg. são paulo - SP)

The order_items.csv contain following features:

Features	Description
order_id	A Unique ID of order made by the consumers
order_item_id	A Unique ID given to each item ordered in the order
product_id	A Unique ID given to each product available on the site
seller_id	Unique ID of the seller registered in Target
shipping_limit_date	The date before which shipping of the ordered product must be completed
price	Actual price of the products ordered
freight_value	Price rate at which a product is delivered from one point to another

The payments.csv contain following features:

Features	Description
order_id	A Unique ID of order made by the consumers.
payment_sequential	Sequences of the payments made in case of EMI
payment_type	Mode of payment used (Eg. Credit Card)
payment_installments	Number of installments in case of EMI purchase.

payment_value	Total amount paid for the purchase order

The orders.csv contain following features:

| Features	Description
order_id	A Unique ID of order made by the consumers
customer_id	ID of the consumer who made the purchase
order_status	Status of the order made i.e. delivered, shipped, etc.
order_purchase_timestamp	Timestamp of the purchase
order_delivered_carrier_date	Delivery date at which carrier made the delivery
order_delivered_customer_date	Date at which customer got the product
order_estimated_delivery_date	Estimated delivery date of the products

The reviews.csv contain following features:

Features	Description
review_id	ID of the review given on the product ordered by the order id
order_id	A Unique ID of order made by the consumers
review_score	Review score given by the customer for each order on a scale of 1-5
review_comment_title	Title of the review
review_comment_message	Review comments posted by the consumer for each order
review_creation_date	Timestamp of the review when it is created
review_answer_timestamp	Timestamp of the review answered

The products.csv contain following features:

Features	Description

product_id	A Unique identifier for the proposed project.
product_category_name	Name of the product category
product_name_lenght	Length of the string which specifies the name given to the products ordered
product_description_lenght	Length of the description written for each product ordered on the site.
product_photos_qty	Number of photos of each product ordered available on the shopping portal
product_weight_g	Weight of the products ordered in grams
product_length_cm	Length of the products ordered in centimeters
product_height_cm	Height of the products ordered in centimeters
product_width_cm	Width of the product ordered in centimeters

Dataset schema:
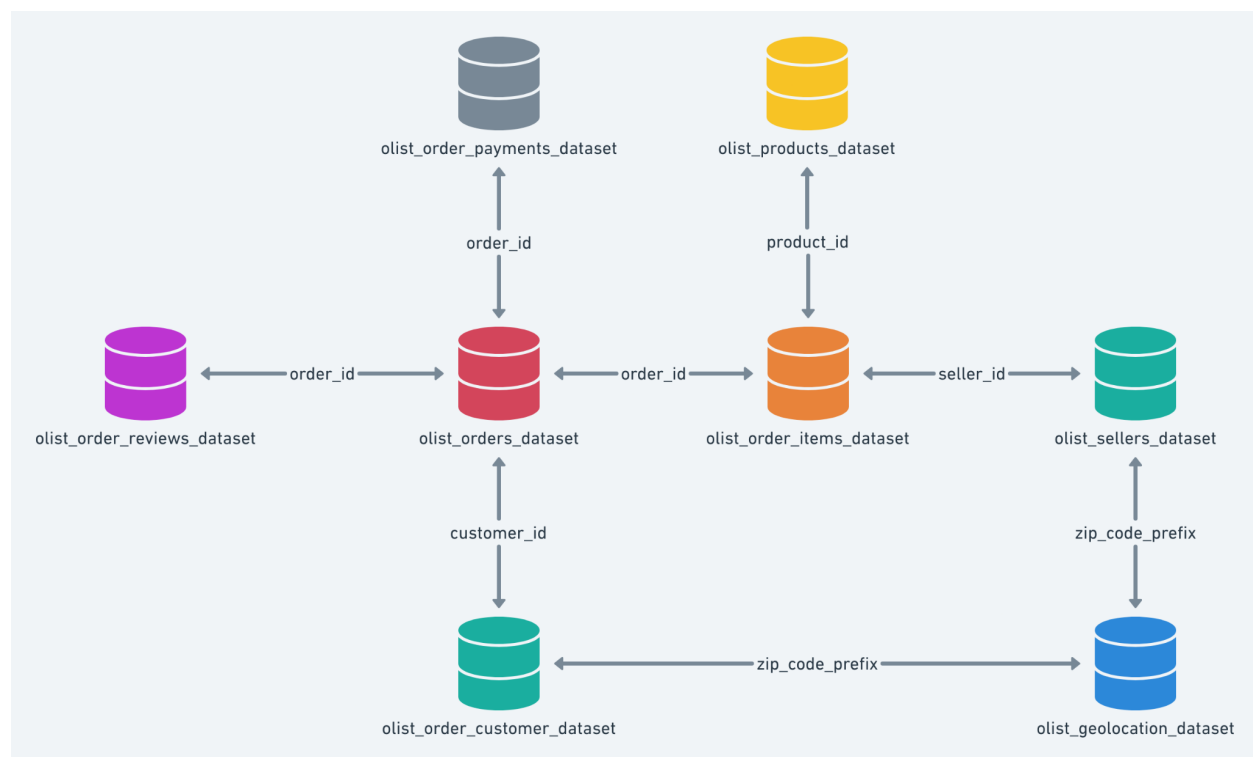
How to get started?

To complete the case study, begin by downloading the CSV files from the provided link. Afterward, proceed to upload them onto BigQuery for further analysis.

Assuming you have already established a project called "**Ecommerce**" in your SQL workspace, the next step is to create a new dataset named "**target**."

Now, systematically upload each CSV file as a separate BigQuery table within the "**target**" dataset.

Once all the files have been successfully uploaded, you can conveniently access them within the query editor by referencing the dataset and table names.

For example,
- To access the "**customers**" table, you would use the reference `target.customers`.
- Similarly, for the "**orders**" table, you would use `target.orders`, and so on.

What is expected?

Assuming you are a data analyst/ scientist at Target, you have been assigned the task of analyzing the given dataset to extract valuable insights and provide actionable recommendations.

Submission Process:

Once you're done with the case study...
- Use a Word document to paste your SQL queries along with a screenshot of the first 10 rows from the output.
- List down any valuable insights that you find during the analysis and provide some action items from the company's perspective in order to improve the current situation.
- Convert your solutions doc into a PDF, and upload the same on the platform.
- Please note that after submitting once, you will not be allowed to edit your submission.

General Guidelines:

- Evaluation will be kept lenient, so make sure you attempt this case study.

- It is understandable that you might struggle with getting started on this or feel stuck at some point.
  In such case:
    a. Read the question carefully and try to understand what exactly is being asked.
    b. Brainstorm a little. If you're getting an error, remember that Google is your best friend.
    c. You can watch the lecture recordings or go through your lecture notes once again if you feel like you're getting confused over some specific topics.
    d. Discuss your problems with your peers. Make use of the Slack channel and WhatsApp group.
    e. Only if you think that there's a major issue, you can reach out to your Instructor via Slack or Email.

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What does 'good' look like?

I. **Import the dataset and do usual exploratory analysis steps like checking the structure & characteristics of the dataset.**
   A. Data type of all columns in the "customers" table.

   Hint: We want you to display the data type of each column present in the "customers" table.

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

   Hint: We want you to get the date & time when the first and last orders in our dataset were placed.

   C. Count the number of Cities and States in our dataset.

   Hint: We want you to count the number of unique cities and states present in our dataset.

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II. **In-depth Exploration:**
   A. Is there a growing trend in the no. of orders placed over the past years?

   Hint: We want you to find out if no. of orders placed has increased gradually in each month, over the past years.

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

Hint: We want you to find out if the no. of orders placed are at peak during certain months.

C. 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

Hint: We want you to categorize the hours of a day into the given time brackets/ intervals and find out during which intervals the Brazilian customers usually order the most.

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

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

Hint: We want you to get the no. of orders placed in each state, in each month by our customers.

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

Hint: We want you to get the no. of unique customers present in each state.

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

A. Get the % increase in the cost of orders from year 2017 to 2018 *(include months between Jan to Aug only)*.

Hint: You can use the payment_value column in the payments table to get the cost of orders.

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

Hint: We want you to fetch the total price and the average price of orders for each state.

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

Hint: We want you to fetch the total freight value and the average freight value of orders for each state.

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V. Analysis based on sales, freight and delivery time.

    A. 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.

    Hint: You can calculate the delivery time and the difference between the estimated & actual delivery date using the given formula:
- **time_to_deliver** = order_delivered_customer_date - order_purchase_timestamp
- **diff_estimated_delivery** = order_estimated_delivery_date - order_delivered_customer_date

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

    Hint: We want you to find the top 5 & the bottom 5 states arranged in increasing order of the average freight value.

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

    Hint: We want you to find the top 5 & the bottom 5 states arranged in increasing order of the average delivery time.

    D. 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.

    Hint: Include only the orders that are already delivered.

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VI. Analysis based on the payments:

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

Hint: We want you to count the no. of orders placed using different payment methods in each month over the past years.

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

Hint: We want you to count the no. of orders placed based on the no. of payment installments where at least one installment has been successfully paid.

FAQs

Q. Which platform am I supposed to use for writing queries?
You are advised to use **BigQuery** as the platform for solving this case study.

Q. I am having issues setting up BigQuery .
For any query related to **BigQuery setup**, you can refer to this doc - link

Q. How do I get data types of columns in BigQuery?
We can get the data type of a column using the BigQuery **INFORMATION_SCHEMA**.

Q. What do you mean by **month on month** in the questions?
Month on Month means for each month starting from 1 (Jan) to 12 (Dec) in natural order.

Q. Do I need to find the time difference or the date difference?
You have to find the difference between the given timestamps in **days**.