Eniac case study project

Key questions to answer:

1/ Is Magist a good partner for high-end tech products?

2/ Are deliveries with the Public Post Office fast enough?

3/ Current trends in the Brazilian market

There are two main concerns:

- **Eniac's catalogue is 100% tech products** and heavily based on Apple-compatible accessories. **It is not clear that Magist is a good partner for these high-end tech products**.

- Among Eniac's efforts to have happy customers, **fast deliveries are key**. The delivery fees resulting from Magist's deal with the public Post Office might be cheap, but at what cost? **Are deliveries fast enough?**

The main purpose of the presentation is **to recommend whether or not to sign the deal with Magist**. Your recommendation should be based on a clear story created from the **information you get from the given dataset** and your **own research about the Brazilian market, like current trends, business opportunities, and competitors**.

Explore the tables

1. How many orders are there in the dataset?

SELECT
   COUNT(order_id)
FROM
   orders;

COUNT(order_id): 99441

COMMENT: There are 99,441 orders in the database.

2. Are orders actually delivered?

SELECT
   order_status, COUNT(order_status) AS count_order_status,
   ROUND(
   100.0
   * COUNT(order_status)
   / SUM(COUNT(order_status)) OVER ()
  ,2) AS pct_of_total
FROM orders
GROUP BY order_status
ORDER BY count_order_status DESC;

order_status	count_order_status	pct_of_total
delivered	96478	97.02
shipped	1107	1.11
canceled	625	0.63
unavailable	609	0.61
invoiced	314	0.32
processing	301	0.30
created	5	0.01
approved	2	0.00

COMMENT: About 97% of orders in the database are delivered (96,478 orders).

3. Is Magist having user growth?

SELECT
   YEAR(order_purchase_timestamp) AS order_year,
   MONTH(order_purchase_timestamp) AS order_month,
   COUNT(order_id) AS order_count
FROM
   orders
GROUP BY YEAR(order_purchase_timestamp) , MONTH(order_purchase_timestamp)
ORDER BY order_year DESC , order_month DESC;

order_year	order_month	order_count
2018	10	4
2018	9	16
2018	8	6549
2018	7	6265
2018	6	6176
2018	5	6872
2018	4	6930
2018	3	7212
2018	2	6735
2018	1	7254
2017	12	5681
2017	11	7538
2017	10	4636
2017	9	4285
2017	8	4337
2017	7	4013
2017	6	3256
2017	5	3695
2017	4	2402
2017	3	2678
2017	2	1780
2017	1	798
2016	12	1
2016	10	324
2016	9	4

COMMENT: About 97% of orders in the database were delivered (96,478 orders).

4. How many products are there on the products table?

SELECT COUNT(product_id) AS product_count
FROM
    products;

product_count
32951

COMMENT: There are 32,951 products on the products table.

5. Which are the categories with the most products?

SELECT
    product_category_name_english AS category,
    COUNT(product_id) AS count_product_offered
FROM
    products AS p
        LEFT JOIN
    product_category_name_translation AS t ON p.product_category_name = t.product_category_name
GROUP BY product_category_name_english
ORDER BY count_product_offered DESC;

category	count_product_offered
bed_bath_table	3029
sports_leisure	2867
furniture_decor	2657
health_beauty	2444
housewares	2335
auto	1900
computers_accessories	1639
toys	1411
watches_gifts	1329
telephony	1134
baby	919
perfumery	868
stationery	849
fashion_bags_accessories	849
cool_stuff	789
garden_tools	753
pet_shop	719
others	610
electronics	517
construction_tools_construction	400

COMMENT: The categories with the most products are: bed_bath_table, sports_leisure and furniture_decor. See table above.

6. How many of those products were present in actual transactions?

SELECT

   product_category_name_english AS category,

   COUNT(DISTINCT i.product_id) AS count_product_ordered

FROM

   order_items AS i

     LEFT JOIN

   products AS p ON i.product_id = p.product_id

     LEFT JOIN

   product_category_name_translation AS t ON p.product_category_name = t.product_category_name

GROUP BY product_category_name_english

ORDER BY count_product_ordered DESC;

category	count_product_ordered
bed_bath_table	3029
sports_leisure	2867
furniture_decor	2657
health_beauty	2444
housewares	2335
auto	1900
computers_accessories	1639
toys	1411
watches_gifts	1329
telephony	1134
baby	919
perfumery	868
fashion_bags_accessories	849
stationery	849
cool_stuff	789
garden_tools	753
pet_shop	719
others	610
electronics	517
construction_tools_construction	400

SELECT

       COUNT(DISTINCT product_id) AS count_product_ordered

FROM

       order_items;

	count_product_ordered
▶	32951

7. What's the price for the most expensive and cheapest products?

SELECT

  product_category_name_english AS category, MAX(price) AS max_price

FROM

  order_items AS i

    LEFT JOIN

  products AS p ON i.product_id = p.product_id

    LEFT JOIN

  product_category_name_translation AS t ON p.product_category_name = t.product_category_name

GROUP BY category

ORDER BY max_price DESC;

category	max_price
housewares	6735
computers	6729
art	6499
small_appliances	4799
musical_instruments	4399.87
consoles_games	4099.99
sports_leisure	4059
watches_gifts	3999.9
others	3980
garden_tools	3930

SELECT

  product_category_name_english AS category, MIN(price) AS min_price

FROM

  order_items AS i

    LEFT JOIN

  products AS p ON i.product_id = p.product_id

    LEFT JOIN

  product_category_name_translation AS t ON p.product_category_name = t.product_category_name

GROUP BY category

ORDER BY min_price ASC;

category	min_price
construction_tools_construction	0.85
health_beauty	1.2
stationery	2.29
pet_shop	2.9
others	3
housewares	3.06
auto	3.49
art	3.5
baby	3.54
music	3.85

COMMENT: Price for the cheapest product is 0.85 Euro (Category: construction_tools_construction).

8. What are the highest and lowest payment values?

SELECT

   MAX(payment_value) AS max_payment, MIN(payment_value) AS min_payment

FROM

   order_payments;

max_payment	min_payment
13664.1	0

COMMENT: Highest payment value is 13,664 Euro. Lowest payment value is 0.

SELECT

   order_id, ROUND(SUM(payment_value), 2) AS total_order_payment

FROM

   order_payments

GROUP BY order_id

ORDER BY total_order_payment DESC

LIMIT 10;

order_id	total_order_payment
03caa2c082116e1d31e67e9ae3700499	13664.1
736e1922ae60d0d6a89247b851902527	7274.88
0812eb902a67711a1cb742b3cdaa65ae	6929.31
fefacc66af859508bf1a7934eab1e97f	6922.21
f5136e38d1a14a4dbd87dff67da82701	6726.66
2cc9089445046817a7539d90805e6e5a	6081.54
a96610ab360d42a2e5335a3998b4718a	4950.34
b4c4b76c642808cbe472a32b86cddc95	4809.44
199af31afc78c699f0dbf71fb178d4d4	4764.34
8dbc85d1447242f3b127dda390d56e19	4681.78

COMMENT: Maximum total amount paid for an order is 13,664.10 Euro.

Answer business questions

In relation to the products:

1. What categories of tech products does Magist have?

```sql
CREATE OR REPLACE VIEW tech_products AS
  SELECT
    product_category_name,
    product_category_name_english,
    CASE
      WHEN
        product_category_name_english IN ('audio' , 'computers',
          'computers_accessories',
          'electronics',
          'pc_gamer',
          'tablets_printing_image',
          'telephony')
      THEN
        'tech_product'
      ELSE 'non_tech_product'
    END AS product_category_type
  FROM
    product_category_name_translation
  ORDER BY product_category_type DESC , product_category_name_english ASC;
```

COMMENT: There are a total of 74 product categories defined in the database. Out of these, 7 'tech' related categories can be defined.

product_category_name	product_category_name_english	product_category_type
audio	audio	tech_product
pcs	computers	tech_product
informatica_acessorios	computers_accessories	tech_product
eletronicos	electronics	tech_product
pc_gamer	pc_gamer	tech_product
tablets_impressao_imagem	tablets_printing_image	tech_product
telefonia	telephony	tech_product
agro_industria_e_comercio	agro_industry_and_commerce	non_tech_product
climatizacao	air_conditioning	non_tech_product
artes	art	non_tech_product
artes_e_artesanato	arts_and_craftmanship	non_tech_product
automotivo	auto	non_tech_product
bebes	baby	non_tech_product
cama_mesa_banho	bed_bath_table	non_tech_product
livros_interesse_geral	books_general_interest	non_tech_product
livros_importados	books_imported	non_tech_product
livros_tecnicos	books_technical	non_tech_product
cds_dvds_musicais	cds_dvds_musicals	non_tech_product
artigos_de_natal	christmas_supplies	non_tech_product
cine_foto	cine_photo	non_tech_product
consoles_games	consoles_games	non_tech_product
construcao_ferramentas_...	construction_tools_construction	non_tech_product
construcao_ferramentas_i...	construction_tools_lights	non_tech_product
construcao_ferramentas ...	construction_tools_safety	non_tech_product

2. How many products of these tech categories have been sold (within the time window of the database snapshot)?

SELECT
   COUNT(DISTINCT i.product_id) AS count_product_sold -- Do I need to put DISTINCT or not?
FROM
  order_items AS i
    LEFT JOIN
  products AS p ON i.product_id = p.product_id
    LEFT JOIN
  tech_products AS t ON p.product_category_name = t.product_category_name
WHERE product_category_type = 'tech_product';

count_product_sold
3390

COMMENT: A total of 3,390 DISTINCT products of category type 'tech' have been sold . The distribution of this amount of DISTINCT products among the different 'tech' categories is shown in the table below.

```
SELECT
    product_category_name_english AS product_category, product_category_type,
    COUNT(DISTINCT i.product_id) AS count_product_sold
FROM
    order_items AS i
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name
GROUP BY product_category, product_category_type
HAVING product_category_type = 'tech_product'
ORDER BY count_product_sold DESC, product_category ASC;
```

product_category	product_category_type	count_product_sold
computers_accessories	tech_product	1639
telephony	tech_product	1134
electronics	tech_product	517
audio	tech_product	58
computers	tech_product	30
tablets_printing_image	tech_product	9
pc_gamer	tech_product	3

3. What percentage does that represent from the overall number of products sold?

```
SELECT
    COUNT(DISTINCT i.product_id) AS count_product_sold
FROM
    order_items AS i
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name;
```

count_product_sold
32951

COMMENT: A total of 32,951 DISTINCT products (of every category) have been sold. From this, a percentage of DISTINCT 'tech' units sold can be calculated as 14.2%.

```
SELECT
    product_category_name_english AS product_category, product_category_type,
    COUNT(DISTINCT i.product_id) AS count_product_ordered,
    ROUND(
    100.0
    * COUNT(DISTINCT i.product_id)
    / SUM(COUNT(DISTINCT i.product_id)) OVER ()
    ,2) AS pct_of_total
FROM
    order_items AS i
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name
GROUP BY product_category, product_category_type
ORDER BY product_category_type DESC, pct_of_total DESC;
```

product_category	product_category_type	count_product_ordered	pct_of_total
computers_accessories	tech_product	1639	4.97
telephony	tech_product	1134	3.44
electronics	tech_product	517	1.57
audio	tech_product	58	0.18
computers	tech_product	30	0.09
tablets_printing_image	tech_product	9	0.03
pc_gamer	tech_product	3	0.01
bed_bath_table	non_tech_product	3029	9.19
sports_leisure	non_tech_product	2867	8.70
furniture_decor	non_tech_product	2657	8.06
health_beauty	non_tech_product	2444	7.42

COMMENT: The category 'computer_accesories' has the highest percentage of units sold among the 'tech' categories (about 5%). Telephony is the second most sold 'tech' category (3.5%). In general, 'non-tech' products have a higher percentage of units sold, compared to 'tech' products.

4. What's the average price of the products being sold?

```sql
SELECT
    ROUND(AVG(i.price),2) AS avg_price
FROM
    order_items AS i
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name;
```

avg_price
120.65

COMMENT: The average price of ALL products being sold is 120.65 Euro.

```sql
SELECT
    product_category_type, MAX(price) AS max_price, MIN(price) AS min_price, ROUND(AVG(price),2) AS
avg_price
FROM
    order_items AS i
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name
GROUP BY product_category_type
ORDER BY product_category_type DESC, avg_price DESC;
```

product_category_type	max_price	min_price	avg_price
tech_product	6729	3.9	106.25
non_tech_product	6735	0.85	123

COMMENT: The average price of 'tech' products being sold is 106.25 Euro. The average price of 'non-tech' products being sold is 123.00 Euro.

```sql
SELECT
    product_category_name_english AS category_name, product_category_type, MAX(price) AS max_price,
MIN(price) AS min_price, ROUND(AVG(price),2) AS avg_price
FROM
    order_items AS i
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name
GROUP BY category_name, product_category_type
HAVING product_category_type = 'tech_product'
ORDER BY product_category_type DESC, avg_price DESC, category_name ASC;
```

category_name	product_category_type	max_price	min_price	avg_price
computers	tech_product	6729	34.5	1098.34
pc_gamer	tech_product	239	129.99	171.77
audio	tech_product	598.99	14.9	139.25
computers_accessories	tech_product	3699.99	3.9	116.51
tablets_printing_image	tech_product	889.99	14.9	90.7
telephony	tech_product	2428	5	71.21
electronics	tech_product	2470.5	3.99	57.91

==COMMENT: The 'tech' category with the highest average price of products being sold is 'computers' (average price is 1098.34 Euro). The 'tech' category with the lowest average price of products being sold is 'electronics' (average price is 57.91 Euro).==

5. Are expensive tech products popular?

SELECT product_category_type, COUNT(i.product_id) AS count_sales,
   CASE
      WHEN price >= 1000 THEN 'High Price'
      WHEN price >= 500 AND price < 1000 THEN 'Medium Price'
      WHEN price >= 100 AND price < 500 THEN 'Low Price'
      ELSE 'Super Low Price'
   END AS 'price_category'
FROM
   order_items AS i
      LEFT JOIN
   products AS p ON i.product_id = p.product_id
      LEFT JOIN
   tech_products AS t ON p.product_category_name = t.product_category_name
GROUP BY product_category_type, price_category
HAVING product_category_type = 'tech_product'
ORDER BY count_sales DESC;

product_category_type	count_sales	price_category
tech_product	11320	Super Low Price
tech_product	4000	Low Price
tech_product	304	Medium Price
tech_product	174	High Price

==COMMENT: 'tech' products with a 'High Price' (i.e. >1000 Euro) have low sales (i.e. not popular).==

SELECT

```sql
        product_category_name_english AS category_name, product_category_type, ROUND(AVG(price),2) AS
ave_category_price,
                CASE WHEN AVG(price) >= 1000 THEN 'High Price'
                    WHEN AVG(price) >= 500 AND AVG(price) < 1000 THEN 'Medium Price'
            WHEN AVG(price) >= 100 AND AVG(price) < 500 THEN 'Low Price'
            ELSE 'Super Low Price'
            END AS price_category,
                COUNT(i.product_id) AS count_sales
FROM
    order_items AS i
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name
WHERE product_category_type = 'tech_product'
GROUP BY category_name
ORDER BY ave_category_price DESC;
```

category_name	product_category_type	ave_category_price	price_category	count_sales
computers	tech_product	1098.34	High Price	203
pc_gamer	tech_product	171.77	Low Price	9
audio	tech_product	139.25	Low Price	364
computers_accessories	tech_product	116.51	Low Price	7827
tablets_printing_image	tech_product	90.7	Super Low Price	83
telephony	tech_product	71.21	Super Low Price	4545
electronics	tech_product	57.91	Super Low Price	2767

COMMENT: 'High Price' tech categories (e.g., computers) have low sales (i.e., not popular). The most popular 'tech' categories are 'computer_accessories' and 'telephony', with average product prices of 117 and 71 Euros, respectively (i.e., Low Price).

In relation to the sellers:

6. How many months of data are included in the magist database?

SELECT
 MIN(DATE_FORMAT(order_purchase_timestamp, '%Y-%m')) AS first_month,
 MAX(DATE_FORMAT(order_purchase_timestamp, '%Y-%m')) AS last_month,
 TIMESTAMPDIFF(
  MONTH,
  MIN(order_purchase_timestamp),
  MAX(order_purchase_timestamp)
) + 1 AS total_months
FROM orders;

first_month	last_month	total_months
2016-09	2018-10	26

COMMENT: There are 26 months of data included in the database.

7. How many sellers are there?

SELECT
   COUNT(seller_id) AS seller_count
FROM
   sellers;

seller_count
3095

COMMENT: There are 3,095 sellers in the database.

8. How many Tech sellers are there? What percentage of overall sellers are Tech sellers?

SELECT
   COUNT(DISTINCT i.seller_id) AS seller_count
FROM
   order_items AS i
     LEFT JOIN
   products AS p ON i.product_id = p.product_id
     LEFT JOIN
   tech_products AS t ON p.product_category_name = t.product_category_name
WHERE
   product_category_type = 'tech_product';

seller_count
454

```
SELECT
    product_category_name_english AS category_name,
    product_category_type,
    COUNT(DISTINCT i.seller_id) AS seller_count
FROM
    order_items AS i
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name
WHERE
    product_category_type = 'tech_product'
GROUP BY category_name
ORDER BY seller_count DESC;
```

category_name	product_category_type	seller_count
computers_accessories	tech_product	287
electronics	tech_product	149
telephony	tech_product	149
audio	tech_product	36
computers	tech_product	9
tablets_printing_image	tech_product	6
pc_gamer	tech_product	2

9. What is the total amount earned by all sellers?

```
SELECT
    ROUND(SUM(price), 2) AS total_earnings
FROM
    order_items AS i
        LEFT JOIN
    orders AS o ON i.order_id = o.order_id
WHERE
    o.order_status NOT IN ('unavailable' , 'canceled');
```

total_earnings
13494400.74

10. What is the total amount earned by all Tech sellers?

```sql
SELECT
    ROUND(SUM(price), 2) AS tech_sellers_earnings
FROM
  order_items AS i
     LEFT JOIN
  orders AS o ON i.order_id = o.order_id
     LEFT JOIN
  products AS p ON i.product_id = p.product_id
     LEFT JOIN
  tech_products AS t ON p.product_category_name = t.product_category_name
WHERE
  product_category_type = 'tech_product'
     AND o.order_status NOT IN ('unavailable' , 'canceled');
```

tech_sellers_earnings
1666211.29

11. Can you work out the average monthly income of all sellers?

```sql
SELECT
    DATE_FORMAT(order_purchase_timestamp, '%Y-%m') AS purchase_month,
    ROUND(SUM(price), 2) AS total_monthly_earning
FROM
  order_items AS i
     LEFT JOIN
  orders AS o ON i.order_id = o.order_id
WHERE
  o.order_status NOT IN ('unavailable' , 'canceled')
GROUP BY purchase_month
ORDER BY purchase_month DESC;
```

purchase_month	total_monthly_earning
2018-09	145
2018-08	854375.85
2018-07	874395.88
2018-06	868479.55
2018-05	987557.51
2018-04	992480.02
2018-03	981196.23
2018-02	839059.32
2018-01	943631.05
2017-12	743169.21
2017-11	1003189.59
2017-10	660542.32
2017-09	621913.73
2017-08	568319.96
2017-07	491060.74
2017-06	431777.3
2017-05	501862.1
2017-04	353902.86
2017-03	367673.64
2017-02	245348.52
2017-01	119594.3
2016-12	10.9
2016-10	44507.3
2016-09	207.86

```sql
SELECT
    ROUND(AVG(total_monthly_earning), 2) AS avg_monthly_earning
FROM
    (SELECT
        DATE_FORMAT(o.order_purchase_timestamp, '%Y-%m') AS purchase_month,
            SUM(i.price) AS total_monthly_earning
    FROM
        order_items AS i
    LEFT JOIN orders AS o ON i.order_id = o.order_id
    WHERE
        o.order_status NOT IN ('unavailable' , 'canceled')
    GROUP BY purchase_month) AS monthly_totals;
```

avg_monthly_earning
562266.7

COMMENT: The average monthly income of all sellers is 562,266.70 Euro. Dividing this amount among ALL DISTINCT sellers (3,095), an estimated average monthly income by seller is obtained as 181.67 Euro.

12. Can you work out the average monthly income of Tech sellers?

```
SELECT
    DATE_FORMAT(order_purchase_timestamp, '%Y-%m') AS purchase_month,
    product_category_type,
    ROUND(SUM(price), 2) AS total_monthly_earning
FROM
    order_items AS i
        LEFT JOIN
    orders AS o ON i.order_id = o.order_id
        LEFT JOIN
    products AS p ON i.product_id = p.product_id
        LEFT JOIN
    tech_products AS t ON p.product_category_name = t.product_category_name
WHERE
    product_category_type = 'tech_product'
        AND o.order_status NOT IN ('unavailable' , 'canceled')
GROUP BY purchase_month
ORDER BY purchase_month DESC;
```

purchase_month	product_category_type	total_monthly_earning
2018-08	tech_product	99815.19
2018-07	tech_product	90936.58
2018-06	tech_product	89381.33
2018-05	tech_product	102187.28
2018-04	tech_product	108133.24
2018-03	tech_product	134932.22
2018-02	tech_product	133222.6
2018-01	tech_product	123323.81
2017-12	tech_product	79876.5
2017-11	tech_product	121742.66
2017-10	tech_product	111810.87
2017-09	tech_product	106016.46
2017-08	tech_product	83927.77
2017-07	tech_product	55951.6
2017-06	tech_product	48292.72
2017-05	tech_product	64874.76
2017-04	tech_product	33907.34
2017-03	tech_product	41819.45
2017-02	tech_product	24711.42
2017-01	tech_product	9423.01
2016-10	tech_product	1924.48

COMMENT: The table above shows the monthly income by ONLY the 'tech' sellers, from 2016 to 2018.

```sql
SELECT
    ROUND(AVG(total_monthly_earning), 2) AS avg_monthly_earning
FROM
    (SELECT
        DATE_FORMAT(o.order_purchase_timestamp, '%Y-%m') AS purchase_month,
            product_category_type,
            SUM(i.price) AS total_monthly_earning
    FROM
        order_items AS i
    LEFT JOIN orders AS o ON i.order_id = o.order_id
    LEFT JOIN products AS p ON i.product_id = p.product_id
    LEFT JOIN tech_products AS t ON p.product_category_name = t.product_category_name
    WHERE
        product_category_type = 'tech_product'
            AND o.order_status NOT IN ('unavailable' , 'canceled')
    GROUP BY purchase_month) AS monthly_totals;
```

avg_monthly_earning
79343.39

COMMENT: The average monthly income of ONLY the 'tech' sellers is 79,343.39 Euro. Dividing this amount among ALL DISTINCT 'tech' sellers (454), an estimated average monthly income by 'tech' seller is obtained as 174.77 Euro.

In relation to the delivery time

13. What's the average time between the order being placed and the product being delivered?

<div style="color:red">

SELECT

  ROUND(AVG(TIMESTAMPDIFF(DAY,

      order_purchase_timestamp,

      order_delivered_customer_date)),

    2) AS avg_delivery_days

FROM

  orders

WHERE

  order_status = 'delivered'

    AND order_delivered_customer_date IS NOT NULL;

</div>

avg_delivery_days
12.10

COMMENT: The average time between the order being placed and the product being delivered is 12.1 days.

14. How many orders are delivered on time vs orders delivered with a delay?

<div style="color:red">

SELECT

  SUM(CASE

    WHEN

      order_status = 'delivered'

        AND order_delivered_customer_date <= order_estimated_delivery_date

    THEN 1

    ELSE 0

  END) AS on_time_deliveries,

  SUM(CASE

    WHEN

      order_status = 'delivered'

        AND order_delivered_customer_date > order_estimated_delivery_date

    THEN 1

    ELSE 0

  END) AS delayed_deliveries

FROM orders

WHERE

  order_estimated_delivery_date IS NOT NULL

    AND order_delivered_customer_date IS NOT NULL;

</div>

on_time_deliveries	delayed_deliveries
88644	7826

15. Is there any pattern for delayed orders, e.g. big products being delayed more often?

```
WITH item_delays AS (
  SELECT
    p.product_id,
    p.product_weight_g,
    /* bucket weights into e.g. light/medium/heavy */
    CASE
      WHEN p.product_weight_g < 1000 THEN 'light, < 1000 g'
      WHEN p.product_weight_g BETWEEN 1000 AND 5000 THEN 'medium, between 1000 and 5000 g'
      ELSE 'heavy > 5000 g'
    END AS weight_bucket,
    CASE
      WHEN o.order_status = 'delivered'
        AND o.order_delivered_customer_date > o.order_estimated_delivery_date
      THEN 1 ELSE 0
    END AS was_delayed
  FROM order_items i
  JOIN orders o ON i.order_id = o.order_id
  JOIN products p ON i.product_id = p.product_id
)
SELECT
  weight_bucket,
  COUNT(*)                      AS total_items,
  SUM(was_delayed)              AS delayed_items,
  ROUND(100 * SUM(was_delayed) / COUNT(*), 2) AS pct_delayed
FROM item_delays
GROUP BY weight_bucket
ORDER BY FIELD(weight_bucket, 'light, < 1000 g','medium, between 1000 and 5000 g','heavy > 5000 g');
```

weight_bucket	total_items	delayed_items	pct_delayed
light, < 1000 g	66598	4909	7.37
medium, between 1000 and 5000 g	32134	2604	8.10
heavy > 5000 g	13918	1201	8.63