**CASE 1: ORDER ANALYSIS**

**Question 1:**

Please examine the monthly distribution of orders. The order\_approved\_at date should be used for the date data.

**Query:**

SELECT date\_trunc ('month', order\_approved\_at)::date AS order\_month,

COUNT (order\_id) AS total\_order

FROM orders

WHERE order\_approved\_at IS NOT NULL

GROUP BY 1

ORDER BY 1;

|  |  |  |
| --- | --- | --- |
|  | Order Month | Total Order |
| 1 | 2016-09-01 | 1 |
| 2 | 2016-10-01 | 320 |
| 3 | 2016-12-01 | 1 |
| 4 | 2017-01-01 | 760 |
| 5 | 2017-02-01 | 1765 |
| 6 | 2017-03-01 | 2689 |
| 7 | 2017-04-01 | 2374 |
| 8 | 2017-05-01 | 3693 |
| 9 | 2017-06-01 | 3252 |
| 10 | 2017-07-01 | 3974 |
| 11 | 2017-08-01 | 4348 |
| 12 | 2017-09-01 | 4301 |
| 13 | 2017-10-01 | 4590 |
| 14 | 2017-11-01 | 7395 |
| 15 | 2017-12-01 | 5832 |
| 16 | 2018-01-01 | 7187 |
| 17 | 2018-02-01 | 6706 |
| 18 | 2018-03-01 | 7288 |
| 19 | 2018-04-01 | 6778 |
| 20 | 2018-05-01 | 7066 |
| 21 | 2018-06-01 | 6164 |
| 22 | 2018-07-01 | 6176 |
| 23 | 2018-08-01 | 6620 |
| 24 | 2018-09-01 | 1 |

**Comment:** The highest number of orders belongs to November 2017. This might be due to the discounts offered in November. There has also been a noticeable increase in order numbers starting from March 2017 compared to previous months. When we look into the reasons in later questions, I can say that there is a constant increase in category diversity on a monthly basis.

**Question 2:**

**--**Analyze the order count breakdown by order status on a monthly basis. Visualize the resulting output using Excel.

**--**Are there any months with a dramatic increase or decrease? Examine the data and provide your insights.

**Query:**

SELECT date\_trunc ('month', order\_approved\_at)::date AS order\_month,

order\_status,

COUNT (order\_id) AS total\_order

FROM orders

WHERE order\_approved\_at is not null

GROUP BY 1,2

ORDER BY 1;

|  |  |  |
| --- | --- | --- |
| Order Month | Order Status | Total Order |
| 2016-09-01 | delivered | 1 |
| 2016-10-01 | canceled | 20 |
| 2016-10-01 | delivered | 265 |
| 2016-10-01 | invoiced | 18 |
| 2016-10-01 | processing | 2 |
| 2016-10-01 | shipped | 9 |
| 2016-10-01 | unavailable | 6 |
| 2016-12-01 | delivered | 1 |
| 2017-01-01 | canceled | 2 |
| 2017-01-01 | delivered | 715 |
| 2017-01-01 | invoiced | 11 |
| 2017-01-01 | processing | 8 |
| 2017-01-01 | shipped | 16 |
| 2017-01-01 | unavailable | 8 |
| 2017-02-01 | approved | 1 |
| 2017-02-01 | canceled | 15 |
| 2017-02-01 | delivered | 1638 |
| 2017-02-01 | invoiced | 12 |
| 2017-02-01 | processing | 31 |
| 2017-02-01 | shipped | 21 |
| 2017-02-01 | unavailable | 47 |
| 2017-03-01 | canceled | 31 |
| 2017-03-01 | delivered | 2554 |
| 2017-03-01 | invoiced | 3 |
| 2017-03-01 | processing | 24 |
| 2017-03-01 | shipped | 45 |
| 2017-03-01 | unavailable | 32 |
| 2017-04-01 | approved | 1 |
| 2017-04-01 | canceled | 13 |
| 2017-04-01 | delivered | 2278 |
| 2017-04-01 | invoiced | 14 |
| 2017-04-01 | processing | 10 |
| 2017-04-01 | shipped | 49 |
| 2017-04-01 | unavailable | 9 |
| 2017-05-01 | canceled | 19 |
| 2017-05-01 | delivered | 3548 |
| 2017-05-01 | invoiced | 16 |
| 2017-05-01 | processing | 24 |
| 2017-05-01 | shipped | 54 |
| 2017-05-01 | unavailable | 32 |
| 2017-06-01 | canceled | 14 |
| 2017-06-01 | delivered | 3143 |
| 2017-06-01 | invoiced | 11 |
| 2017-06-01 | processing | 12 |
| 2017-06-01 | shipped | 48 |
| 2017-06-01 | unavailable | 24 |
| 2017-07-01 | canceled | 23 |
| 2017-07-01 | delivered | 3828 |
| 2017-07-01 | invoiced | 6 |
| 2017-07-01 | processing | 11 |
| 2017-07-01 | shipped | 54 |
| 2017-07-01 | unavailable | 52 |
| 2017-08-01 | canceled | 21 |
| 2017-08-01 | delivered | 4217 |
| 2017-08-01 | invoiced | 20 |
| 2017-08-01 | processing | 18 |
| 2017-08-01 | shipped | 41 |
| 2017-08-01 | unavailable | 31 |
| 2017-09-01 | canceled | 16 |
| 2017-09-01 | delivered | 4170 |
| 2017-09-01 | invoiced | 17 |
| 2017-09-01 | processing | 21 |
| 2017-09-01 | shipped | 40 |
| 2017-09-01 | unavailable | 37 |
| 2017-10-01 | canceled | 21 |
| 2017-10-01 | delivered | 4441 |
| 2017-10-01 | invoiced | 17 |
| 2017-10-01 | processing | 21 |
| 2017-10-01 | shipped | 33 |
| 2017-10-01 | unavailable | 57 |
| 2017-11-01 | canceled | 29 |
| 2017-11-01 | delivered | 7150 |
| 2017-11-01 | invoiced | 34 |
| 2017-11-01 | processing | 25 |
| 2017-11-01 | shipped | 71 |
| 2017-11-01 | unavailable | 86 |
| 2017-12-01 | canceled | 7 |
| 2017-12-01 | delivered | 5675 |
| 2017-12-01 | invoiced | 14 |
| 2017-12-01 | processing | 35 |
| 2017-12-01 | shipped | 58 |
| 2017-12-01 | unavailable | 43 |
| 2018-01-01 | canceled | 32 |
| 2018-01-01 | delivered | 6991 |
| 2018-01-01 | invoiced | 15 |
| 2018-01-01 | processing | 29 |
| 2018-01-01 | shipped | 73 |
| 2018-01-01 | unavailable | 47 |
| 2018-02-01 | canceled | 71 |
| 2018-02-01 | delivered | 6536 |
| 2018-02-01 | invoiced | 6 |
| 2018-02-01 | processing | 6 |
| 2018-02-01 | shipped | 56 |
| 2018-02-01 | unavailable | 31 |
| 2018-03-01 | canceled | 23 |
| 2018-03-01 | delivered | 7083 |
| 2018-03-01 | invoiced | 23 |
| 2018-03-01 | processing | 9 |
| 2018-03-01 | shipped | 134 |
| 2018-03-01 | unavailable | 16 |
| 2018-04-01 | canceled | 14 |
| 2018-04-01 | delivered | 6639 |
| 2018-04-01 | invoiced | 14 |
| 2018-04-01 | processing | 6 |
| 2018-04-01 | shipped | 99 |
| 2018-04-01 | unavailable | 6 |
| 2018-05-01 | canceled | 24 |
| 2018-05-01 | delivered | 6940 |
| 2018-05-01 | invoiced | 24 |
| 2018-05-01 | processing | 8 |
| 2018-05-01 | shipped | 54 |
| 2018-05-01 | unavailable | 16 |
| 2018-06-01 | canceled | 18 |
| 2018-06-01 | delivered | 6097 |
| 2018-06-01 | invoiced | 3 |
| 2018-06-01 | shipped | 42 |
| 2018-06-01 | unavailable | 4 |
| 2018-07-01 | canceled | 39 |
| 2018-07-01 | delivered | 6050 |
| 2018-07-01 | invoiced | 12 |
| 2018-07-01 | processing | 1 |
| 2018-07-01 | shipped | 62 |
| 2018-07-01 | unavailable | 12 |
| 2018-08-01 | canceled | 32 |
| 2018-08-01 | delivered | 6504 |
| 2018-08-01 | invoiced | 24 |
| 2018-08-01 | shipped | 47 |
| 2018-08-01 | unavailable | 13 |
| 2018-09-01 | shipped | 1 |

TOTAL DELIVERED

|  |  |  |
| --- | --- | --- |
| Order month | Order status | Total order |
| 2016-09-01 | delivered | 1 |
| 2016-10-01 | delivered | 265 |
| 2016-12-01 | delivered | 1 |
| 2017-01-01 | delivered | 715 |
| 2017-02-01 | delivered | 1638 |
| 2017-03-01 | delivered | 2554 |
| 2017-04-01 | delivered | 2278 |
| 2017-05-01 | delivered | 3548 |
| 2017-06-01 | delivered | 3143 |
| 2017-07-01 | delivered | 3828 |
| 2017-08-01 | delivered | 4217 |
| 2017-09-01 | delivered | 4170 |
| 2017-10-01 | delivered | 4441 |
| 2017-11-01 | delivered | 7150 |
| 2017-12-01 | delivered | 5675 |
| 2018-01-01 | delivered | 6991 |
| 2018-02-01 | delivered | 6536 |
| 2018-03-01 | delivered | 7083 |
| 2018-04-01 | delivered | 6639 |
| 2018-05-01 | delivered | 6940 |
| 2018-06-01 | delivered | 6097 |
| 2018-07-01 | delivered | 6050 |
| 2018-08-01 | delivered | 6504 |
| TOTAL DELIVERED | | 96464 |

TOTAL CANCELED

|  |  |  |
| --- | --- | --- |
| Order Month | Order Status | Total Order |
| 2016-10-01 | canceled | 20 |
| 2017-01-01 | canceled | 2 |
| 2017-02-01 | canceled | 15 |
| 2017-03-01 | canceled | 31 |
| 2017-04-01 | canceled | 13 |
| 2017-05-01 | canceled | 19 |
| 2017-06-01 | canceled | 14 |
| 2017-07-01 | canceled | 23 |
| 2017-08-01 | canceled | 21 |
| 2017-09-01 | canceled | 16 |
| 2017-10-01 | canceled | 21 |
| 2017-11-01 | canceled | 29 |
| 2017-12-01 | canceled | 7 |
| 2018-01-01 | canceled | 32 |
| 2018-02-01 | canceled | 71 |
| 2018-03-01 | canceled | 23 |
| 2018-04-01 | canceled | 14 |
| 2018-05-01 | canceled | 24 |
| 2018-06-01 | canceled | 18 |
| 2018-07-01 | canceled | 39 |
| 2018-08-01 | canceled | 32 |
| TOTAL CANCELED | | 484 |

TOTAL UNAVAILABLE

|  |  |  |
| --- | --- | --- |
| Order Month | Order Status | Total Order |
| 2016-10-01 | unavailable | 6 |
| 2017-01-01 | unavailable | 8 |
| 2017-02-01 | unavailable | 47 |
| 2017-03-01 | unavailable | 32 |
| 2017-04-01 | unavailable | 9 |
| 2017-05-01 | unavailable | 32 |
| 2017-06-01 | unavailable | 24 |
| 2017-07-01 | unavailable | 52 |
| 2017-08-01 | unavailable | 31 |
| 2017-09-01 | unavailable | 37 |
| 2017-10-01 | unavailable | 57 |
| 2017-11-01 | unavailable | 86 |
| 2017-12-01 | unavailable | 43 |
| 2018-01-01 | unavailable | 47 |
| 2018-02-01 | unavailable | 31 |
| 2018-03-01 | unavailable | 16 |
| 2018-04-01 | unavailable | 6 |
| 2018-05-01 | unavailable | 16 |
| 2018-06-01 | unavailable | 4 |
| 2018-07-01 | unavailable | 12 |
| 2018-08-01 | unavailable | 13 |
| TOTAL UNAVAILABLE | | 609 |

**Comment:** The highest number of delivered orders was in November 2017, and after that point, there has been an increase in sales compared to the past. The reason for this might be the addition of new categories on a monthly basis as we examine the subsequent questions. The highest number of unavailable items occurred in November 2017, but if we look at the data from April to November 2017, we can see that as the number of orders increased, the numbers of delivered, unavailable, and canceled orders also increased at a similar rate. Additionally, there was a dramatic rise in the number of canceled orders in February 2018 compared to other times, which could be attributed to logistics and delivery issues, market competition, and even cancellations of gifts for Valentine's Day, indicating emotional shopping behavior. Overall, when we examine the data, we see that the company entered the market in September 2016, and order volumes began to rise in January 2017. By the end of 2017, the average number of orders was approximately 3,800, and despite the lack of data for the last four months of 2018, the average number of orders observed was around 6,800.

**Question 3:**

Examine the order numbers by product category. What categories stand out on special occasions? For example, New Year’s, Valentine's Day...

**Query:**

SELECT p.product\_category\_name,

COUNT (DISTINCT o.order\_id) AS total\_order

FROM products p

JOIN order\_items oi ON p.product\_id=oi.product\_id

JOIN orders o ON oi.order\_id=o.order\_id

WHERE p.product\_category\_name IS NOT NULL

GROUP BY 1

ORDER BY 2 DESC;

|  |  |  |
| --- | --- | --- |
|  | Category name | Total order |
| 1 | cama\_mesa\_banho | 9417 |
| 2 | beleza\_saude | 8836 |
| 3 | esporte\_lazer | 7720 |
| 4 | informatica\_acessorios | 6689 |
| 5 | moveis\_decoracao | 6449 |
| 6 | utilidades\_domesticas | 5884 |
| 7 | relogios\_presentes | 5624 |
| 8 | telefonia | 4199 |
| 9 | automotivo | 3897 |
| 10 | brinquedos | 3886 |
| 11 | cool\_stuff | 3632 |
| 12 | ferramentas\_jardim | 3518 |
| 13 | perfumaria | 3162 |
| 14 | bebes | 2885 |
| 15 | eletronicos | 2550 |
| 16 | papelaria | 2311 |
| 17 | fashion\_bolsas\_e\_acessorios | 1864 |
| 18 | pet\_shop | 1710 |
| 19 | moveis\_escritorio | 1273 |
| 20 | consoles\_games | 1062 |
| 21 | malas\_acessorios | 1034 |
| 22 | eletrodomesticos | 764 |
| 23 | construcao\_ferramentas\_construcao | 748 |
| 24 | eletroportateis | 630 |
| 25 | instrumentos\_musicais | 628 |
| 26 | livros\_interesse\_geral | 512 |
| 27 | casa\_construcao | 490 |
| 28 | alimentos | 450 |
| 29 | moveis\_sala | 422 |
| 30 | casa\_conforto | 397 |
| 31 | audio | 350 |
| 32 | bebidas | 297 |
| 33 | market\_place | 280 |
| 34 | livros\_tecnicos | 260 |
| 35 | climatizacao | 253 |
| 36 | moveis\_cozinha\_area\_de\_servico\_jantar\_e\_jardim | 248 |
| 37 | construcao\_ferramentas\_iluminacao | 244 |
| 38 | fashion\_calcados | 240 |
| 39 | industria\_comercio\_e\_negocios | 235 |
| 40 | eletrodomesticos\_2 | 234 |
| 41 | alimentos\_bebidas | 227 |
| 42 | telefonia\_fixa | 217 |
| 43 | artes | 202 |
| 44 | construcao\_ferramentas\_jardim | 194 |
| 45 | agro\_industria\_e\_comercio | 182 |
| 46 | pcs | 181 |
| 47 | construcao\_ferramentas\_seguranca | 167 |
| 48 | sinalizacao\_e\_seguranca | 140 |
| 49 | artigos\_de\_natal | 128 |
| 50 | fashion\_underwear\_e\_moda\_praia | 121 |
| 51 | fashion\_roupa\_masculina | 112 |
| 52 | construcao\_ferramentas\_ferramentas | 97 |
| 53 | moveis\_quarto | 95 |
| 54 | tablets\_impressao\_imagem | 79 |
| 55 | portateis\_casa\_forno\_e\_cafe | 75 |
| 56 | cine\_foto | 65 |
| 57 | dvds\_blu\_ray | 59 |
| 58 | livros\_importados | 53 |
| 59 | fashion\_roupa\_feminina | 39 |
| 60 | artigos\_de\_festas | 39 |
| 61 | moveis\_colchao\_e\_estofado | 38 |
| 62 | musica | 38 |
| 63 | flores | 29 |
| 64 | fraldas\_higiene | 27 |
| 65 | fashion\_esporte | 27 |
| 66 | casa\_conforto\_2 | 24 |
| 67 | artes\_e\_artesanato | 23 |
| 68 | portateis\_cozinha\_e\_preparadores\_de\_alimentos | 14 |
| 69 | la\_cuisine | 13 |
| 70 | cds\_dvds\_musicais | 12 |
| 71 | pc\_gamer | 8 |
| 72 | fashion\_roupa\_infanto\_juvenil | 8 |
| 73 | seguros\_e\_servicos | 2 |

**--Let’s examine the category counts by monthly and the order counts by category in the monthly breakdown.**

**1.Query:**

SELECT date\_trunc ('month', order\_approved\_at)::date AS order\_month,

COUNT (DISTINCT p.product\_category\_name) AS total\_category

FROM products p

JOIN order\_items oi ON p.product\_id=oi.product\_id

JOIN orders o ON oi.order\_id=o.order\_id

WHERE p.product\_category\_name IS NOT NULL

GROUP BY 1; --category numbers by monthly

**2.Query:**

SELECT order\_month,

category\_name,

total\_order

FROM (

SELECT to\_char(order\_approved\_at,'MM') AS order\_month,

p.product\_category\_name AS category\_name,

COUNT (DISTINCT o.order\_id) AS total\_order

FROM products p

JOIN order\_items oi ON p.product\_id=oi.product\_id

JOIN orders o ON oi.order\_id=o.order\_id

WHERE p.product\_category\_name IS NOT NULL

GROUP BY 1,2

) AS monthly\_orders

WHERE (order\_month,total\_order)

IN (

SELECT order\_month,

MAX (total\_order)

FROM (

SELECT to\_char(order\_approved\_at,'MM') AS order\_month,

p.product\_category\_name AS category\_name,

COUNT (DISTINCT o.order\_id) AS total\_order

FROM products p

JOIN order\_items oi

ON p.product\_id=oi.product\_id

JOIN orders o

ON oi.order\_id=o.order\_id

WHERE p.product\_category\_name IS NOT NULL

GROUP BY 1,2

) AS sub\_monthly\_orders

GROUP BY order\_month )

ORDER BY order\_month;

|  |  |  |
| --- | --- | --- |
| **Order Month** | **Category Name** | **Total Order** |
| 1 | cama\_mesa\_banho | 728 |
| 2 | informatica\_acessorios | 906 |
| 3 | cama\_mesa\_banho | 920 |
| 4 | cama\_mesa\_banho | 832 |
| 5 | beleza\_saude | 972 |
| 6 | beleza\_saude | 1036 |
| 7 | cama\_mesa\_banho | 1025 |
| 8 | beleza\_saude | 1135 |
| 9 | cama\_mesa\_banho | 460 |
| 10 | cama\_mesa\_banho | 453 |
| 11 | cama\_mesa\_banho | 799 |
| 12 | cama\_mesa\_banho | 497 |

**Comment:** Generally, the most ordered category has been the glass-table-bath group. The highest number of orders was in June, July, and August, while the least orders were taken in September, October, and December. The most orders in August were for beauty and care products, which may be due to the fact that in some regions of Brazil, August corresponds to winter, leading to increased interest in skincare products, or there may have been promotions for these products.

**--Let's analyze the number of orders given before Valentine's Day on February 14 and the top 5 categories by year.**

**1.Query:** Between '2017-02-01' and '2017-02-28'

SELECT date\_trunc ('month', order\_purchase\_timestamp)::date AS order\_month,

p.product\_category\_name,

COUNT (DISTINCT o.order\_id) AS total\_order

FROM products p

JOIN order\_items oi ON p.product\_id = oi.product\_id

JOIN orders o ON oi.order\_id = o.order\_id

WHERE p.product\_category\_name IS NOT NULL

AND o.order\_purchase\_timestamp >= '2017-02-01'

AND o.order\_purchase\_timestamp < '2017-02-28'

GROUP BY 1,2

ORDER BY 1,3 DESC

LIMIT 5;

**2.Query:** Between '2018-02-01' and '2018-02-28'

SELECT date\_trunc('month', order\_purchase\_timestamp)::date AS order\_month,

p.product\_category\_name,

COUNT(DISTINCT o.order\_id) AS total\_order

FROM products p

JOIN order\_items oi ON p.product\_id = oi.product\_id

JOIN orders o ON oi.order\_id = o.order\_id

WHERE p.product\_category\_name IS NOT NULL

AND o.order\_purchase\_timestamp >= '2018-02-01'

AND o.order\_purchase\_timestamp < '2018-02-28'

GROUP BY 1,2

ORDER BY 1,3 DESC

LIMIT 5;

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| order\_date | category\_name | total\_order |  | order\_date | category\_name | total\_order |
| 2017-02-01 | moveis\_decoracao | 216 |  | 2018-02-01 | informatica\_acessorios | 764 |
| 2017-02-01 | beleza\_saude | 154 |  | 2018-02-01 | beleza\_saude | 587 |
| 2017-02-01 | cama\_mesa\_banho | 140 |  | 2018-02-01 | cama\_mesa\_banho | 566 |
| 2017-02-01 | esporte\_lazer | 132 |  | 2018-02-01 | esporte\_lazer | 548 |
| 2017-02-01 | telefonia | 100 |  | 2018-02-01 | moveis\_decoracao | 324 |

**Comment:** If we compare February 2017 with February 2018, we can't see Informatica in the table because we set a limit of 5 in 2017, but it was actually in the 6th place, and its total order was 95. Looking at the others, I see that the increases are 80% for Informatica, 41% for Esporte, 40% for Cama Mesa, 38% for Beleza, and 15% for Moveis. The ratios of Informatica and Movies are striking here. For Informatica, I can say that there may have been discounts, marketing, and advertising strategies that reached potential customers, an increase in market demand, and it could be part of a trend product group. For Movies, I can say that the market for this product group may be saturated or there might be a limited customer base, no innovative approaches have been made, they may not be trend products, the prices might be high, and there could have been difficulties in reaching the customers.

**Question 4:**

Examine the order counts based on the days of the week (Monday, Thursday, etc.) and the days of the month (1st, 2nd, etc.). Create a visual in Excel using the output of your query and provide an analysis.

**1.Query:**

SELECT to\_char (order\_purchase\_timestamp, 'DAY') AS daysweek,

COUNT (DISTINCT order\_id) AS total\_order

FROM orders

GROUP BY 1

ORDER BY 2 DESC;

**Comment:** The highest orders are on Monday, while the lowest orders are on Saturday and Sunday. I can say that the habit of buying online is more noticeable during the weekdays.

**2.Query:**

SELECT EXTRACT (DAY FROM order\_purchase\_timestamp) AS days,

COUNT (DISTINCT order\_id) AS total\_order

FROM orders

GROUP BY 1

ORDER BY 1,2;

**Comment:** We can see that the highest number of orders occurs on the 24th, while the lowest number of orders is on the 31st. Generally, there are increases in the first and middle days of the month, while a decrease starts after the 24th. I can say that people might be earning income during the first and middle days of the month, and they tend to reduce their spending towards the end of the month.