

Show only the top 5 rows from the members table ?

```
select *  
from `cryptocurrency.members`  
limit 5
```

| member_id ▾ | first_name ▾ | region ▾  |
|-------------|--------------|-----------|
| c20ad4      | Leah         | Asia      |
| 6512bd      | Vikram       | India     |
| d3d944      | Enoch        | Africa    |
| c4ca42      | Danny        | Australia |
| 45c48c      | Ben          | Australia |

Sort all the rows in the members table by first\_name in alphabetical order and show the top 3 rows with all columns?

```
select *  
from `cryptocurrency.members`  
order by first_name  
limit 3
```

| member_id ▾ | first_name ▾ | region ▾      |
|-------------|--------------|---------------|
| c9f0f8      | Abe          | United States |
| 8f14e4      | Alex         | United States |
| 167909      | Ayush        | United States |

Count the number of records from the members table which have United States as the region value?

```
select count(*) as cnt  
from `cryptocurrency.members`  
where region = "United States"
```

| cnt ▾ |
|-------|
| 7     |

Select only the first\_name and region columns for mentors who are not from Australia?

```
select first_name, region
from `cryptocurrency.members`
where region <> 'Australia'
order by first_name
```

| first_name | region        |
|------------|---------------|
| Abe        | United States |
| Alex       | United States |
| Ayush      | United States |
| Charlie    | United States |
| Enoch      | Africa        |
| Leah       | Asia          |
| Nandita    | United States |
| Rowan      | United States |
| Vikram     | India         |
| Vipul      | United States |

Return only the unique region values from the members table and sort the output by reverse alphabetical order?

```
select distinct region
from `cryptocurrency.members`
order by region desc
```

| region        |
|---------------|
| United States |
| India         |
| Australia     |
| Asia          |
| Africa        |

How many records are there per ticker value in the prices table?

```
select ticker, count(*) cnt
from `cryptocurrency.prices`
```

group by ticker

| ticker ▼ | cnt ▼ |
|----------|-------|
| BTC      | 1702  |
| ETH      | 1702  |

What is the maximum, minimum values for the price column for both Bitcoin and Ethereum in 2020?

```
select ticker, max(price) as maximum, min(price) minimum
from `cryptocurrency.prices`
where extract(year from market_date) = 2020
group by ticker
```

| ticker ▼ | maximum ▼ | minimum ▼ |
|----------|-----------|-----------|
| BTC      | 28949.4   | 4826.0    |
| ETH      | 751.8     | 107.9     |

What is the annual minimum, maximum and average price for each ticker?

```
select ticker, years, min(price) min_price, max(price) max_price ,
avg(price) avg_price
from
(select extract(year from market_date) as years, ticker, price
from `cryptocurrency.prices`
) x
group by ticker, years
order by years
```

| ticker | years | min_price | max_price | avg_price         |
|--------|-------|-----------|-----------|-------------------|
| BTC    | 2017  | 785.4     | 19345.5   | 3981.072328767... |
| ETH    | 2017  | 8.2       | 799.98    | 220.3373698630... |
| BTC    | 2018  | 3228.7    | 17172.3   | 7552.158356164... |
| ETH    | 2018  | 83.81     | 1380.0    | 481.3285753424... |
| BTC    | 2019  | 3397.7    | 13063.8   | 7371.821917808... |
| ETH    | 2019  | 104.55    | 338.54    | 180.9929863013... |
| BTC    | 2020  | 4826.0    | 28949.4   | 11111.63114754... |
| ETH    | 2020  | 107.9     | 751.8     | 307.2967759562... |
| BTC    | 2021  | 29359.9   | 63540.9   | 44353.54979253... |
| ETH    | 2021  | 729.12    | 4167.78   | 2199.116514522... |

What is the monthly average of the price column for each ticker from January 2020 and after?

```
select ticker, month, round(avg(price),2) as avg_price
from
```

```
(select ticker, format_date('%Y-%m', market_date) as month, price
from `cryptocurrency.prices`
) x
where month >= '2020-01'
group by ticker, month
order by ticker, month, avg_price desc
```

| ticker | month   | avg_price |
|--------|---------|-----------|
| BTC    | 2020-01 | 8378.8    |
| BTC    | 2020-02 | 9636.56   |
| BTC    | 2020-03 | 6863.11   |
| BTC    | 2020-04 | 7211.03   |
| BTC    | 2020-05 | 9253.55   |
| BTC    | 2020-06 | 9481.85   |
| BTC    | 2020-07 | 9592.1    |
| BTC    | 2020-08 | 11638.41  |
| BTC    | 2020-09 | 10643.33  |
| BTC    | 2020-10 | 11888.36  |
| BTC    | 2020-11 | 16660.77  |
| BTC    | 2020-12 | 21982.05  |

Convert the volume column in the prices table with an adjusted integer value to take into the unit values

Return only the market\_date, price, volume and adjusted\_volume columns for the first 10 days of August 2021 for Ethereum only

```
select market_date, price, volume,  
       case when substr(volume, -1) = 'K' then cast(left(volume,  
length(volume)-1) as numeric) *1000  
       when substr(volume, -1) = 'M' then cast(left(volume,  
length(volume)-1) as numeric) *1000000  
       end adjusted_volume  
from `cryptocurrency.prices`  
where market_date between '2021-08-01' and '2021-08-10' and ticker =  
"ETH"  
order by market_date, adjusted_volume desc
```

| market_date | price   | volume  | adjusted_volume |
|-------------|---------|---------|-----------------|
| 2021-08-01  | 2556.23 | 1.20M   | 1200000         |
| 2021-08-02  | 2608.04 | 970.67K | 970670          |
| 2021-08-03  | 2506.65 | 158.45K | 158450          |
| 2021-08-04  | 2725.29 | 1.23M   | 1230000         |
| 2021-08-05  | 2827.21 | 1.65M   | 1650000         |
| 2021-08-06  | 2889.43 | 1.06M   | 1060000         |
| 2021-08-07  | 3158.0  | 64.84K  | 64840           |
| 2021-08-08  | 3012.07 | 1.25M   | 1250000         |
| 2021-08-09  | 3162.93 | 1.44M   | 1440000         |
| 2021-08-10  | 3140.71 | 1.12M   | 1120000         |

How many "breakout" days were there in 2020 where the price column is greater than the open column for each ticker? In the same query also calculate the number of "non breakout" days where the price column was lower than or equal to the open column.

```
with cte_1 as (select ticker, count(market_date) breakout_days  
from `cryptocurrency.prices`  
where extract(year from market_date) = 2020 and price > open
```

group by ticker),

```
cte_2 as (select ticker, count(market_date) non_breakout_days
from `cryptocurrency.prices`
where extract(year from market_date) = 2020 and price <= open
group by ticker)
```

```
select c1.*, c2.non_breakout_days
from cte_1 c1
join cte_2 c2
on c1.ticker = c2.ticker
```

| ticker | breakout_days | non_breakout_days |
|--------|---------------|-------------------|
| BTC    | 207           | 159               |
| ETH    | 200           | 166               |

What was the final quantity Bitcoin and Ethereum held by all Data With Danny mentors based off the transactions table?

```
select t.ticker,
```

```
round(sum(case when txn_type = 'BUY' then quantity
else -quantity
end ),2) quantity_sum
```

```
from `cryptocurrency.transactions` t join `cryptocurrency.members` m
on m.member_id = t.member_id
where first_name = 'Danny'
group by t.ticker
```

| ticker | quantity_sum |
|--------|--------------|
| BTC    | 3304.88      |
| ETH    | 3505.04      |

What are the market\_date, price and volume and price\_rank values for the days with the top 5 highest price values for each tickers in the prices table?

```
with cte_1 as
(select ticker, market_date, volume, price, rank()over(partition by ticker
order by price desc) as price_rank
from `cryptocurrency.prices`
```

```

order by price desc
)
select * from cte_1
where price_rank <=5

```

| ticker | market_date | volume  | price   | price_rank |
|--------|-------------|---------|---------|------------|
| BTC    | 2021-04-13  | 126.56K | 63540.9 | 1          |
| BTC    | 2021-04-15  | 76.97K  | 63216.0 | 2          |
| BTC    | 2021-04-14  | 130.43K | 62980.4 | 3          |
| BTC    | 2021-04-16  | 136.85K | 61379.7 | 4          |
| BTC    | 2021-03-13  | 134.64K | 61195.3 | 5          |
| ETH    | 2021-05-11  | 1.27M   | 4167.78 | 1          |
| ETH    | 2021-05-14  | 2.06M   | 4075.38 | 2          |
| ETH    | 2021-05-10  | 2.70M   | 3947.9  | 3          |
| ETH    | 2021-05-09  | 1.94M   | 3922.23 | 4          |
| ETH    | 2021-05-08  | 1.34M   | 3905.55 | 5          |

Calculate a 7 day rolling average for the price and volume columns in the prices table for each ticker..

Return only the first 10 days of August 2021

```

with cte_1 as (select ticker,
                    market_date,
                    price,
                    volume,
                    case when substr(volume, -1) = 'K' then cast(left(volume,
length(volume)-1) as numeric)*1000
                        when substr(volume, -1) = 'M' then cast(left(volume,
length(volume)-1) as numeric) *1000000
                        end volume1
                from `cryptocurrency.prices`),

cte_2 as (select ticker,
                market_date, price,
                round(avg(price)over(partition by ticker order by
market_date rows between 6 preceding and current row ),2) as
rolling_avg_price,
                round(avg(volume1)over(partition by ticker order by
market_date desc rows between 6 preceding and current row ),2) as
rolling_avg_volume,
                row_number()over(partition by ticker order by market_date)
                rn
            from cte_1

```

where market\_date between '2021-08-01' and '2021-08-10')

select ticker, market\_date, price, rolling\_avg\_price, rolling\_avg\_volume  
from cte\_2  
order by ticker, market\_date

| Row | ticker | market_date | price   | rolling_avg_price | rolling_avg_volume |
|-----|--------|-------------|---------|-------------------|--------------------|
| 1   | BTC    | 2021-08-01  | 39878.3 | 39878.3           | 84284.29           |
| 2   | BTC    | 2021-08-02  | 39168.4 | 39523.35          | 87844.29           |
| 3   | BTC    | 2021-08-03  | 38130.3 | 39059.0           | 93882.86           |
| 4   | BTC    | 2021-08-04  | 39736.9 | 39228.48          | 105352.86          |
| 5   | BTC    | 2021-08-05  | 40867.2 | 39556.22          | 109708.33          |
| 6   | BTC    | 2021-08-06  | 42795.4 | 40096.08          | 105530             |
| 7   | BTC    | 2021-08-07  | 44614.2 | 40741.53          | 103930             |
| 8   | BTC    | 2021-08-08  | 43792.8 | 41300.74          | 100960             |
| 9   | BTC    | 2021-08-09  | 46284.3 | 42317.3           | 98815              |
| 10  | BTC    | 2021-08-10  | 45593.8 | 43383.51          | 80550              |

Calculate the daily percentage change in volume for each ticker in the prices table?

a) Percentage change can be calculated as (current - previous) / previous

b) Multiply the percentage by 100 and round the value to 2 decimal places

c) Return data for the first 10 days of August 2021

```
with cte_1 as (select ticker, volume, market_date,
(case when substr(volume, -1) = 'K' then
cast(left(volume,length(volume)-1) as numeric)*1000
when substr(volume, -1) = 'M' then cast(left(volume,length(volume)-
1) as numeric) *1000000
end ) volume1
from `cryptocurrency.prices`
where market_date between '2021-08-01' and '2021-08-10'
)
```

```
select ticker,
market_date,
volume1 as volume,
lag(volume1)over(partition by ticker order by market_date) as
lag_volume,
```



```

        ifnull(round((volume1 - lag(volume1)over(partition by ticker order by
market_date))/ lag(volume1)over(partition by ticker order by
market_date)*100,2),0) as percentage_change
from cte_1
order by ticker

```

| ticker | market_date | volume  | lag_volume | percentage_change |
|--------|-------------|---------|------------|-------------------|
| BTC    | 2021-08-01  | 80330   | null       | 0                 |
| BTC    | 2021-08-02  | 74810   | 80330      | -6.87             |
| BTC    | 2021-08-03  | 260     | 74810      | -99.65            |
| BTC    | 2021-08-04  | 79220   | 260        | 30369.23          |
| BTC    | 2021-08-05  | 130600  | 79220      | 64.86             |
| BTC    | 2021-08-06  | 111930  | 130600     | -14.3             |
| BTC    | 2021-08-07  | 112840  | 111930     | 0.81              |
| BTC    | 2021-08-08  | 105250  | 112840     | -6.73             |
| BTC    | 2021-08-09  | 117080  | 105250     | 11.24             |
| BTC    | 2021-08-10  | 80550   | 117080     | -31.2             |
| ETH    | 2021-08-01  | 1200000 | null       | 0                 |
| ETH    | 2021-08-02  | 970670  | 1200000    | -19.11            |
| ETH    | 2021-08-03  | 158450  | 970670     | -83.68            |
| ETH    | 2021-08-04  | 1230000 | 158450     | 676.27            |
| ETH    | 2021-08-05  | 1650000 | 1230000    | 34.15             |
| ETH    | 2021-08-06  | 1060000 | 1650000    | -35.76            |
| ETH    | 2021-08-07  | 64840   | 1060000    | -93.88            |
| ETH    | 2021-08-08  | 1250000 | 64840      | 1827.82           |
| ETH    | 2021-08-09  | 1440000 | 1250000    | 15.2              |
| ETH    | 2021-08-10  | 1120000 | 1440000    | -22.22            |

Which top 3 mentors have the most Bitcoin quantity? Return the first\_name of the mentors and sort the output from highest to lowest total\_quantity?

```

select first_name,
sum(case when txn_type = 'BUY' then quantity else -quantity end) as
Bitcoin_quantity
from `cryptocurrency.members` m
left join `cryptocurrency.transactions` t
on m.member_id = t.member_id
where ticker = 'BTC'

```

```
group by first_name
order by Bitcoin_quantity desc
limit 3
```

| first_name ▼ | Bitcoin_quantity ▼ |
|--------------|--------------------|
| Nandita      | 4160.219869513...  |
| Leah         | 4046.090896666...  |
| Ayush        | 3945.198083265...  |

Show the market\_date values which have less than 5 transactions? Sort the output in reverse chronological order.

```
select txn_date, count(t.txn_id) as transactions
from `cryptocurrency.prices` p
join `cryptocurrency.transactions` t
on p.ticker = t.ticker
and p.market_date = t.txn_date
group by txn_date
having count(t.txn_id) <5
order by transactions
```

| txn_date ▼ | transactions ▼ |
|------------|----------------|
| 2019-06-14 | 3              |
| 2021-07-17 | 3              |
| 2021-01-06 | 4              |
| 2018-10-20 | 4              |
| 2019-07-15 | 4              |
| 2020-01-17 | 4              |

## Multiple Table Joins

For this question - we will generate a single table output which solves a multi-part problem about the dollar cost average of BTC purchases.

Part 1: Calculate the Dollar Cost Average a) What is the dollar cost average (btc\_dca) for all Bitcoin purchases by region for each calendar year? Create a column called year\_start and use the start of the calendar year The dollar cost average calculation is  $\text{btc\_dca} = \frac{\text{SUM}(\text{quantity} \times \text{price})}{\text{SUM}(\text{quantity})}$

Part 2: Yearly Dollar Cost Average Ranking b) Use this btc\_dca value to generate a dca\_ranking column for each year The region with the lowest btc\_dca each year has a rank of 1

Part 3: Dollar Cost Average Yearly Percentage Change c) Calculate the yearly percentage change in DCA for each region to 2 decimal places This calculation is (current - previous) / previous Finally order the output by region and year\_start columns.

```
with cte_1 as
(select region, DATE_TRUNC( market_date, YEAR)
year_start, sum(quantity*price)/sum(quantity) as btc_dca
from `cryptocurrency.members` m
join `cryptocurrency.transactions` t
on t.member_id = m.member_id
join `cryptocurrency.prices` p
on p.ticker = t.ticker
and p.market_date = t.txn_date
where txn_type = 'BUY' and p.ticker = 'BTC'
group by region, year_start)

select *,
       dense_rank()over(partition by region order by btc_dca) as
dca_ranking,
       ifnull(round((btc_dca - lag(btc_dca)over(partition by region order by
year_start))/ lag(btc_dca)over(partition by region order by
year_start)*100,2),0)
from cte_1
order by region, year_start
```

| Row | region | year_start | btc_dca           | dca_ranking | percentage_change |
|-----|--------|------------|-------------------|-------------|-------------------|
| 1   | Africa | 2017-01-01 | 3987.626286717... | 1           | 0.0               |
| 2   | Africa | 2018-01-01 | 7690.712833435... | 3           | 92.86             |
| 3   | Africa | 2019-01-01 | 7368.820379877... | 2           | -4.19             |
| 4   | Africa | 2020-01-01 | 11114.12477256... | 4           | 50.83             |
| 5   | Africa | 2021-01-01 | 44247.21525962... | 5           | 298.12            |
| 6   | Asia   | 2017-01-01 | 4002.938702624... | 1           | 0.0               |
| 7   | Asia   | 2018-01-01 | 7829.998856964... | 3           | 95.61             |
| 8   | Asia   | 2019-01-01 | 7267.678553097... | 2           | -7.18             |
| 9   | Asia   | 2020-01-01 | 10759.62115482... | 4           | 48.05             |
| 10  | Asia   | 2021-01-01 | 44570.90086971... | 5           | 314.24            |