Crypto Dataset Analysis using SQL

Datasets:

●Transaction.csv
●Prices.csv
●members.csv
●Cryoto.sql

When we explore datasets, especially in a relational database context, understanding the relationships between different tables is crucial. Here's a general outline of steps might we take while exploring datasets:

1. **Identify Tables:** Start by identifying all the tables present in the dataset. Each table represents a different entity or concept, such as members, prices, transactions, etc.

2. **Understand Table Structures:** Examine the structure of each table, including the columns it contains, their data types, and any constraints or indexes defined on the table.

3. **Explore Relationships:** Determine how the tables are related to each other. This typically involves looking for foreign key constraints that establish connections between tables.

4. **Analyze Data Distribution:** Analyze the data distribution within each table. Look for patterns, outliers, missing values, and any other anomalies that may need further investigation.

5. **Aggregate and Summarize Data:** Use aggregation functions to summarize data and gain insights. For example, calculate average values, counts, sums, etc., to understand trends and patterns within the dataset.

6. **Join Tables:** Combine data from multiple tables using SQL JOIN operations. This allows us to create comprehensive views of the data that incorporate information from different sources.

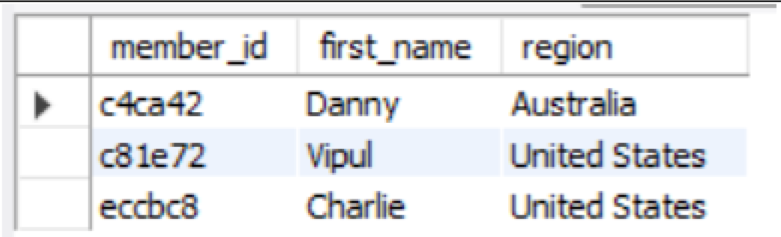
7. **Iterate and Refine:** Continue iterating through these steps as we gain more insights and refine your understanding of the dataset. Don't hesitate to explore different angles or hypotheses to uncover hidden patterns or relationships.

Question 1: Explore Dataset.

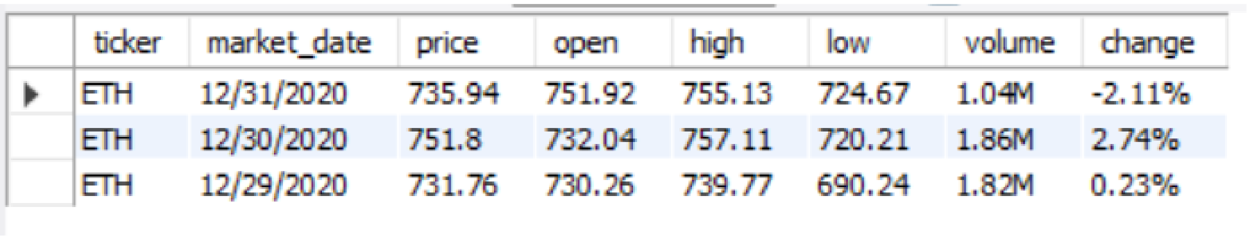
Input

```
SELECT * FROM members
LIMIT 3;
SELECT * FROM prices
LIMIT 3;
SELECT * FROM transactions
LIMIT 3;
```

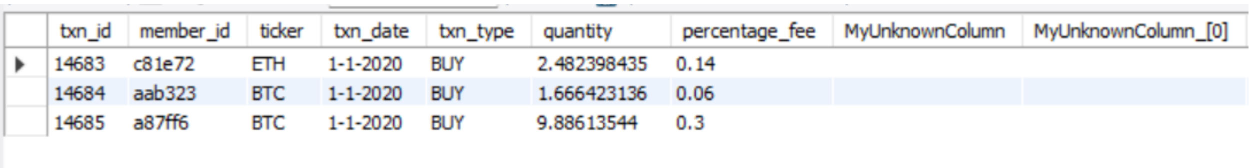
Output



member_id	first_name	region
c4ca42	Danny	Australia
c81e72	Vipul	United States
eccbc8	Charlie	United States



ticker	market_date	price	open	high	low	volume	change
ETH	12/31/2020	735.94	751.92	755.13	724.67	1.04M	-2.11%
ETH	12/30/2020	751.8	732.04	757.11	720.21	1.86M	2.74%
ETH	12/29/2020	731.76	730.26	739.77	690.24	1.82M	0.23%



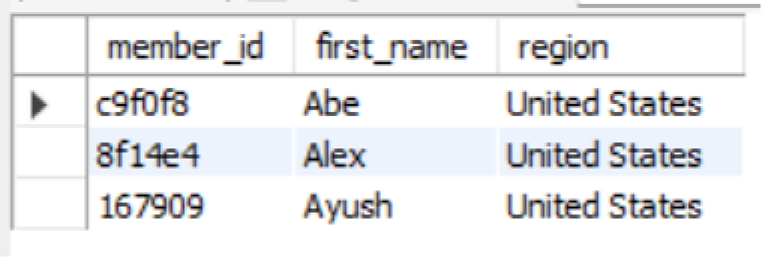
txn_id	member_id	ticker	txn_date	txn_type	quantity	percentage_fee	MyUnknownColumn	MyUnknownColumn_[0]
14683	c81e72	ETH	1-1-2020	BUY	2.482398435	0.14		
14684	aab323	BTC	1-1-2020	BUY	1.666423136	0.06		
14685	a87ff6	BTC	1-1-2020	BUY	9.88613544	0.3		

Question 2: Sort all the rows in the table by first_name in alphabetical order and show the top 3 rows.

Input:

```
SELECT * FROM members
ORDER BY first_name
LIMIT 3;
```

Output:



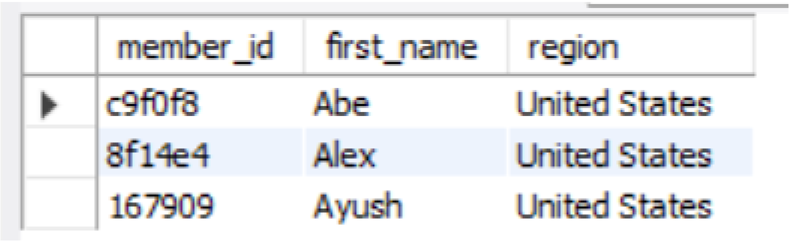
member_id	first_name	region
c9f0f8	Abe	United States
8f14e4	Alex	United States
167909	Ayush	United States

Question 3: Which records from trading members are from the United States region?

Input:

```
SELECT * FROM members
WHERE region = 'United States';
```

Output:



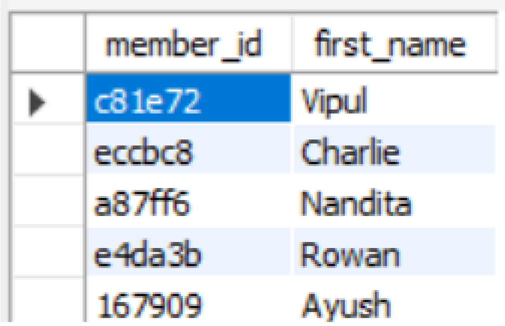
member_id	first_name	region
c9f0f8	Abe	United States
8f14e4	Alex	United States
167909	Ayush	United States

Question 4: Select only the member_id and first_name columns for members not from Australia.

Input:

```
SELECT
  member_id,
  first_name
FROM members
WHERE region != 'Australia';
```

Output:



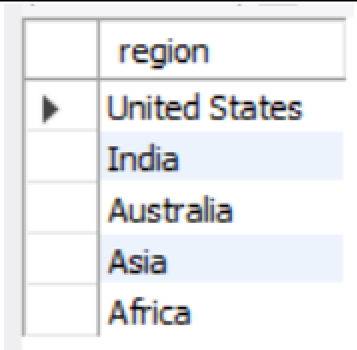
member_id	first_name
c81e72	Vipul
eccbc8	Charlie
a87ff6	Nandita
e4da3b	Rowan
167909	Ayush

Question 5: Return the unique region values from the trading.members table and sort the output by reverse –-alphabetical order

Input:

```
SELECT DISTINCT region
FROM members
ORDER BY region DESC;
```

Output:



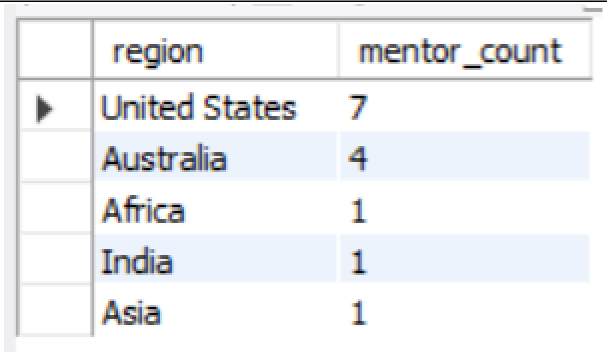
	region
▶	United States
	India
	Australia
	Asia
	Africa

Question 6: How many mentors are there per region? Sort the output by regions with the most mentors to the least.

Input:

```
SELECT
  region,
  COUNT(*) AS mentor_count
FROM members
GROUP BY region
ORDER BY mentor_count DESC;
```

Output:



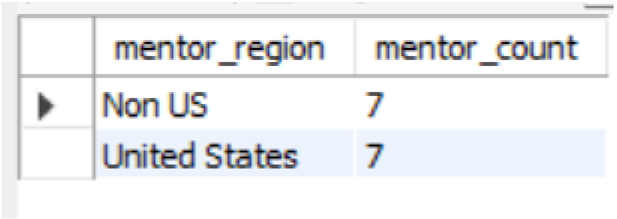
	region	mentor_count
▶	United States	7
	Australia	4
	Africa	1
	India	1
	Asia	1

Question 7: How many US mentors and non-US mentors are there?

Input:

```
SELECT
  (CASE
    WHEN members.region != 'United States' THEN 'Non US'
    ELSE members.region
  END) mentor_region,
  COUNT(*) AS mentor_count
FROM members
GROUP BY  (CASE
    WHEN members.region != 'United States' THEN 'Non US'
    ELSE members.region
  END)
ORDER BY mentor_count DESC;
```

Output:



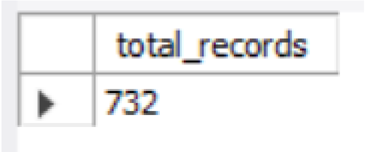
mentor_region	mentor_count
Non US	7
United States	7

Question 8: How many total records do we have in the prices table?

Input:

```
SELECT
  COUNT(*) AS total_records
FROM prices;
```

Output:



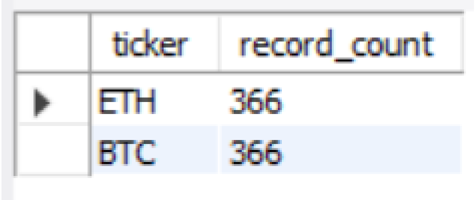
total_records
732

Question 9: How many records are there per ticker value?

Input:

```
SELECT
  ticker,
  COUNT(*) AS record_count
FROM prices
GROUP BY ticker;
```

Output:



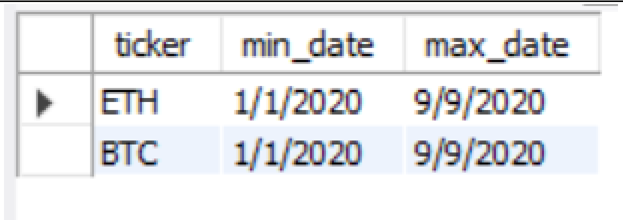
ticker	record_count
ETH	366
BTC	366

Question 10: What are the minimum and maximum market_date values?

Input:

```
SELECT
  ticker,
  MIN(market_date) AS min_date,
  MAX(market_date) AS max_date
FROM prices
GROUP BY ticker;
```

Output:



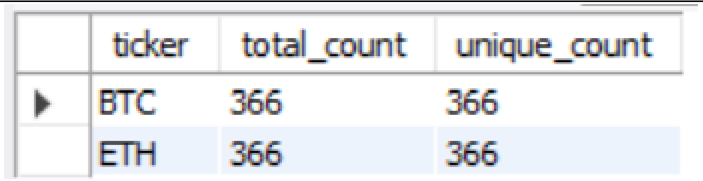
	ticker	min_date	max_date
▶	ETH	1/1/2020	9/9/2020
	BTC	1/1/2020	9/9/2020

Question 11: Are there any duplicate market_date values for any ticker value in our table?

Input:

```
SELECT
  ticker,
  COUNT(market_date) AS total_count,
  COUNT(DISTINCT market_date) AS unique_count
FROM prices
GROUP BY ticker;
```

Output:



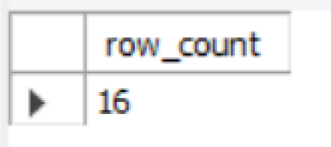
	ticker	total_count	unique_count
▶	BTC	366	366
	ETH	366	366

Question 12: How many days from the prices table exist where the high price of Bitcoin is over $20,000?

Input:

```
SELECT
  COUNT(*) AS row_count
FROM prices
WHERE ticker = 'BTC'
  AND high > 20000;
```

Output:



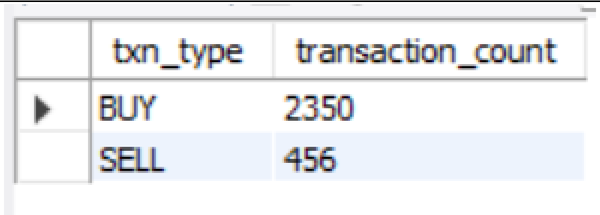
	row_count
▶	16

Question 13: How many buy and sell transactions are there for Bitcoin?

Input:

```
SELECT
  txn_type,
  COUNT(*) AS transaction_count
FROM transactions
WHERE ticker = 'BTC'
GROUP BY txn_type;
```

Output:



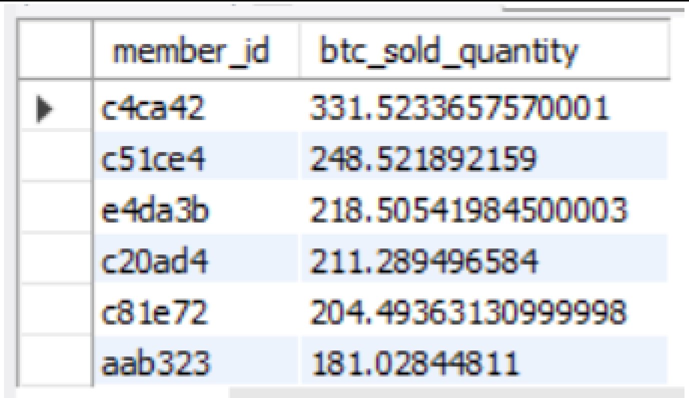
txn_type	transaction_count
BUY	2350
SELL	456

Question 14: Which members have sold less than 500 Bitcoin? Sort the output from the most BTC sold to the least.

Input:

```
WITH cte AS (
SELECT
  member_id,
  SUM(quantity) AS btc_sold_quantity
FROM transactions
WHERE ticker = 'BTC'
  AND txn_type = 'SELL'
GROUP BY member_id
)
SELECT * FROM cte
WHERE btc_sold_quantity < 500
ORDER BY btc_sold_quantity DESC;
```

Output:



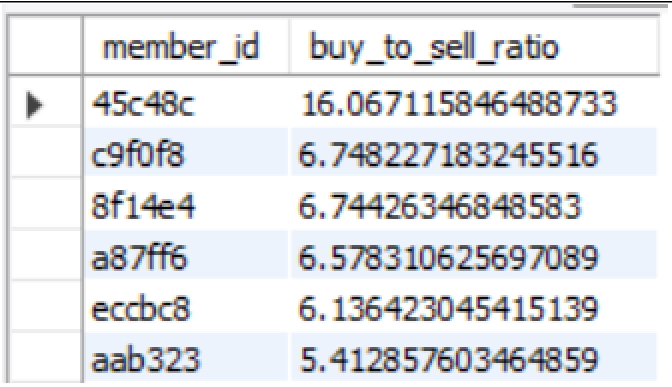
member_id	btc_sold_quantity
c4ca42	331.5233657570001
c51ce4	248.521892159
e4da3b	218.50541984500003
c20ad4	211.289496584
c81e72	204.49363130999998
aab323	181.02844811

Question 15: Which member_id has the highest buy to sell ratio by quantity?

Input:

```
SELECT
  member_id,
  SUM(CASE WHEN txn_type = 'BUY' THEN quantity ELSE 0 END) /
    SUM(CASE WHEN txn_type = 'SELL' THEN quantity ELSE 0 END) AS
buy_to_sell_ratio
FROM transactions
GROUP BY member_id
ORDER BY buy_to_sell_ratio DESC;
```

Output:



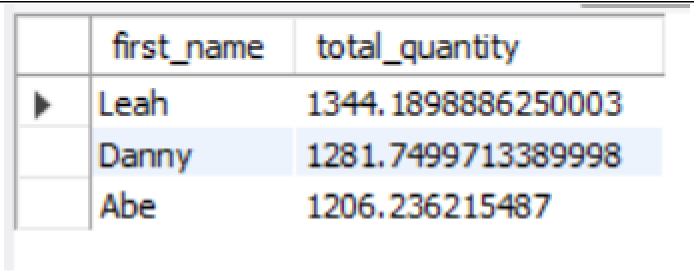
member_id	buy_to_sell_ratio
45c48c	16.067115846488733
c9f0f8	6.748227183245516
8f14e4	6.74426346848583
a87ff6	6.578310625697089
eccbc8	6.136423045415139
aab323	5.412857603464859

Question 16: Which top 3 mentors have the most Bitcoin quantity as of the end of the period?

Input:

```
SELECT
  members.first_name,
  SUM(
    CASE
      WHEN transactions.txn_type = 'BUY'  THEN transactions.quantity
      WHEN transactions.txn_type = 'SELL' THEN transactions.quantity
    END
  ) AS total_quantity
FROM transactions
INNER JOIN members
  ON transactions.member_id = members.member_id
WHERE ticker = 'BTC'
GROUP BY members.first_name
ORDER BY total_quantity DESC
LIMIT 3;
```

Output:



first_name	total_quantity
Leah	1344.1898886250003
Danny	1281.7499713389998
Abe	1206.236215487