Cryptocurrency Market Analysis

Overview:

This project analyzes the real-time impact of the cryptocurrency market on global and national levels. It explores how crypto mining, ETFs, new investors and traders, and decentralized finance influence employment, the environment, and the economy. The study highlights both positive outcomes—such as job creation, financial inclusion, and innovation—and negative effects, such as energy consumption, financial risk, and regulatory challenges. Real-world examples include the USA, Canada, and El Salvador's adoption of Bitcoin, the rise of crypto-based freelancing, and increased global investment through crypto ETFs. It has also become a new financial weapon for some countries, as they use crypto for their strategic reserves.

This project serves as a foundational tool for the crypto industry, bridging technical, financial, and regulatory domains to foster innovation, compliance, and market efficiency in real-time scenarios.

1. BLOCKCHAIN_ACCESS_TYPE

- **Description**: Stores types of blockchain access (e.g., public, private) and their descriptions.
- **Attributes**:
    - TYPE (VARCHAR(200), PK, NOT NULL): Unique identifier for the access type.
    - DESCRIPTION (TEXT, NOT NULL): Explanation of the access type.
- **Normalization**: In 3NF. No partial or transitive dependencies; TYPE uniquely determines DESCRIPTION.
- **Cardinality**:
    - **1:N with CRYPTO (BLOCKCHAIN_ACCESS_TYPE)**: One access type can be associated with multiple cryptocurrencies, ensuring standardized categorization.
- **Real-Time Usage**: Used to classify cryptocurrencies by access type for regulatory compliance and investor analysis in the crypto market.

2. BLOCKCHAIN_TOKEN_TYPE

- **Description**: Defines types of blockchain tokens (e.g., utility, security) with their descriptions.
- **Attributes**:
    - TYPE (VARCHAR(200), PK, NOT NULL): Unique token type identifier.
    - DESCRIPTION (TEXT, NOT NULL): Details about the token type.
- **Normalization**: In 3NF. No dependencies other than TYPE → DESCRIPTION.
- **Cardinality**:
    - **1:N with CRYPTO (BLOCKCHAIN_TOKEN_TYPE)**: One token type applies to multiple cryptocurrencies, ensuring consistent token classification.
- **Real-Time Usage**: Helps in token classification for tax purposes, risk assessment, and market trend analysis.

3. CONSENSUS_ALGORITHM_TYPE

- **Description**: Stores types of consensus algorithms (e.g., Proof of Work, Proof of Stake) with descriptions.
- **Attributes**:
  - TYPE (VARCHAR(200), PK, NOT NULL): Unique algorithm type identifier.
  - DESCRIPTION (TEXT, NOT NULL): Explanation of the algorithm.
- **Normalization**: In 3NF. No redundancy or dependencies.
- **Reason for Process Failure**: None. Simple and normalized.
- **Cardinality**:
  - **1:N with CRYPTO (CONSENSUS_ALGORITHM_TYPE)**: One algorithm type applies to multiple cryptocurrencies.
  - **1:N with HASH_ALGO_NAME (CONSENSUS_ALGORITHM_TYPE)**: One algorithm type can be linked to multiple hash algorithms.
- **Real-Time Usage**: Used to evaluate the security, scalability, and energy efficiency of cryptocurrencies based on their consensus mechanisms.

4. BLOCKCHAIN_NETWORK_TYPE

- **Description**: Categorizes blockchain network types (e.g., mainnet, testnet) with examples and features.
- **Attributes**:
  - TYPE (VARCHAR(200), PK, NOT NULL): Unique network type identifier.
  - DESCRIPTION (TEXT, NOT NULL): Network type explanation.
  - EXAMPLES (TEXT, NOT NULL): Example networks.
  - KEY_FEATURES (TEXT, NOT NULL): Distinct features of the network type.
- **Normalization**: In 3NF. All attributes depend on TYPE.
- **Cardinality**:
  - **1:N with CRYPTO (BLOCKCHAIN_NETWORK_TYPE)**: One network type applies to multiple cryptocurrencies.
- **Real-Time Usage**: Assists in comparing network scalability and decentralization for investment and development decisions.

5. HASH_ALGO_NAME

- **Description**: Details hash algorithms used in consensus mechanisms, including hardware and efficiency metrics.
- **Attributes**:
  - NAME (VARCHAR(200), PK, NOT NULL): Hash algorithm name (e.g., SHA-256).
  - CONSENSUS_ALGORITHM_TYPE (VARCHAR(200), PK, NOT NULL): Associated consensus algorithm.
  - DESCRIPTION (VARCHAR(MAX), NOT NULL): Algorithm details.
  - HARDWARE_TYPE (VARCHAR(200), NOT NULL): Hardware used (e.g., ASIC, GPU).
  - PROS (VARCHAR(MAX), NOT NULL): Advantages of the algorithm.
  - CONS (VARCHAR(MAX), NOT NULL): Disadvantages of the algorithm.
  - ENERGY_EFFICIENCY (VARCHAR(10), NOT NULL, CHECK): Efficiency level (HIGH, LOW, MODERATE).

- **Normalization**: In 3NF. Composite PK (NAME, CONSENSUS_ALGORITHM_TYPE) ensures no redundancy.
- **Cardinality**:
    - **N:1 with CONSENSUS_ALGORITHM_TYPE**: Multiple hash algorithms can be associated with one consensus type.
    - **1:N with CRYPTO (HASH_ALGO_NAME, HASH_ALGO_CONSENSUS_TYPE)**: One hash algorithm can be used by multiple cryptocurrencies.
- **Real-Time Usage**: Evaluates mining efficiency, hardware requirements, and environmental impact for crypto mining operations.

6. CRYPTO

- **Description**: Core table storing cryptocurrency details, including price, supply, and technical attributes.
- **Attributes**:
    - NAME (VARCHAR(200), NOT NULL): Cryptocurrency name.
    - SYMBOL (VARCHAR(10), PK, NOT NULL): Unique ticker (e.g., BTC).
    - MAX_PRICE, MIN_PRICE (DECIMAL(38,15), NOT NULL): Historical price extremes.
    - MAX_PRICE_DATE, MIN_PRICE_DATE (DATE): Dates of price extremes.
    - TOTAL_SUPPLY, CIRCULATING_SUPPLY (DECIMAL(38,15), NOT NULL): Supply metrics.
    - BLOCKCHAIN_ACCESS_TYPE, CONSENSUS_ALGORITHM_TYPE, BLOCKCHAIN_NETWORK_TYPE, BLOCKCHAIN_TOKEN_TYPE (VARCHAR(200), NOT NULL): References to respective types.
    - HASH_ALGO_NAME, HASH_ALGO_CONSENSUS_TYPE (VARCHAR(200)): Composite FK to hash algorithm.
    - FOUNDER (VARCHAR(200), NOT NULL): Founder name.
    - INITIAL_RELEASE_YEAR (INT, NOT NULL): Launch year.
    - OFFICIAL_WEBSITE (VARCHAR(100), NOT NULL): Official website.
    - DESCRIPTION_FOR_MAJOR_CHANGES (VARCHAR(MAX), NOT NULL): Details of major updates (e.g., forks).
- **Normalization**: In 3NF. All attributes depend on SYMBOL. FKs ensure referential integrity.
- **Cardinality**:
    - **1:N with multiple tables (e.g., CRYPTO_CURRENCY_PERFORMANCE_METRICS, MARKET_DOMINANCE)**: One cryptocurrency has multiple performance or dominance records.
    - **N:1 with lookup tables (e.g., BLOCKCHAIN_ACCESS_TYPE)**: Multiple cryptocurrencies share one access type.
- **Real-Time Usage**: Central table for price tracking, technical analysis, and regulatory reporting in the crypto market.

7. CRYPTO_CURRENCY_PERFORMANCE_METRICS

- **Description**: Stores performance metrics for cryptocurrencies, such as transaction speed and energy costs.
- **Attributes**:
  - SYMBOL (VARCHAR(10), PK): References CRYPTO.
  - TRANSACTION_PER_SECOND, AVERAGE_TRX_FEE, ELECTRICITY_COST_PER_BLOCK (DECIMAL(38,15)): Performance and cost metrics.
  - HEAT_IMMERSION_PER_TX (DECIMAL(38,2)): Energy per transaction in Joules.
  - HASH_RATE_PER_UNIT (VARCHAR(50)): Hash rate metric.
  - TOTAL_USERS (DECIMAL(38,0)): Total user count.
- **Normalization**: In 3NF. All attributes depend on SYMBOL.
- **Cardinality**:
  - **1:1 with CRYPTO**: One performance record per cryptocurrency.
- **Real-Time Usage**: Analyzes transaction efficiency, cost, and environmental impact for investment and scalability decisions.

8. TOTAL_USER_DISTRIBUTION

- **Description**: Tracks global cryptocurrency user distribution by region and market cap annually.
- **Attributes**:
  - YEAR (INT, PK): Year of data.
  - ASIA_USER, NORTH_AMERICA_USER, AMERICA_USER, AFRICA_USER, EUROPE_USER, OCEANIA_USER (DECIMAL(38,15)): Regional user counts.
  - TOTAL_USER_IN_WORD (DECIMAL(38,15)): Global user count.
  - TOTAL_MARKET_CAP (DECIMAL(38,15)): Total market capitalization.
- **Normalization**: In 2NF. Partial dependency on YEAR for regional users. AMERICA_USER (sum of North and South America) introduces redundancy.
- **Cardinality**:
  - **1:N with MARKET_DOMINANCE, TOP_BROKERAGE**: One year has multiple dominance or brokerage records.
- **Real-Time Usage**: Monitors global adoption trends and market growth for strategic planning and market expansion.

9. MARKET_DOMINANCE

- **Description**: Tracks annual market dominance of cryptocurrencies.
- **Attributes**:
  - YEAR (INT, PK): Year of data.
  - SYMBOL (VARCHAR(10), PK): Cryptocurrency ticker.
  - MAX_PRICE, MIN_PRICE (DECIMAL(38,15/30)): Price extremes.
  - MAX_PRICE_DATE, MIN_PRICE_DATE (DATE): Dates of price extremes.
  - TOTAL_MARKET_CAP_OF_THIS_CURRENCY (DECIMAL(38,10)): Market cap of the currency.
  - DOMINANCE (FLOAT, CHECK <= 100): Market share percentage.
  - TOTAL_TRANSACTION, TOTAL_USER, TOTAL_WALLET_COUNT (DECIMAL(38,10)): Transaction, user, and wallet metrics in millions.
- **Normalization**: In 3NF. Composite PK (SYMBOL, YEAR) ensures no redundancy.

- **Cardinality**:
  - **N:1 with CRYPTO**: Multiple dominance records per cryptocurrency.
  - **N:1 with TOTAL_USER_DISTRIBUTION**: Multiple dominance records per year.
- **Real-Time Usage**: Analyzes market share and volatility for portfolio management and competitive analysis.

10. COUNTRY

- **Description**: Stores country data, including crypto regulatory status and socioeconomic metrics.
- **Attributes**:
  - COUNTRY_CODE (VARCHAR(50), PK): ISO country code.
  - COUNTRY_NAME (VARCHAR(200)): Country name.
  - CRYPTO_STATUS (VARCHAR(20), CHECK): Status (ACCEPTED, RESTRICTED, BANNED).
  - EDUCATION_PERCENTAGE, UNEMPLOYMENT_RATE (FLOAT): Socioeconomic indicators.
  - GDP (DECIMAL(38,10)): GDP in billions.
- **Normalization**: In 3NF. All attributes depend on COUNTRY_CODE.
- **Cardinality**:
  - **1:N with ACCEPTED_COUNTRY, BANNED_COUNTRY, USER_AMOUNT_IN_BANNED_COUNTRY**: One country has multiple related records.
- **Real-Time Usage**: Assesses regulatory environments and socioeconomic factors for market entry strategies.

11. ACCEPTED_COUNTRY

- **Description**: Details countries where crypto is accepted, including restrictions and infrastructure.
- **Attributes**:
  - COUNTRY_CODE (VARCHAR(50), PK): References COUNTRY.
  - RESTRICTIONS (VARCHAR(200)): Regulatory restrictions.
  - CRYPTO_ATMS (INT, NOT NULL): Number of crypto ATMs.
  - ACCEPTED_YEAR (INT): Year crypto was accepted.
- **Normalization**: In 3NF. All attributes depend on COUNTRY_CODE.
- **Cardinality**:
  - **1:1 with COUNTRY**: One acceptance record per country.
- **Real-Time Usage**: Tracks crypto adoption and infrastructure for market expansion and investment planning.

12. BANNED_COUNTRY

- **Description**: Details countries where crypto is banned, including restrictions.
- **Attributes**:
  - COUNTRY_CODE (VARCHAR(50), PK): References COUNTRY.
  - RESTRICTIONS (VARCHAR(200)): Ban details.
  - CRYPTO_ATMS (INT, NOT NULL): Number of ATMs (likely 0).
  - BANNED_YEAR (INT): Year of ban.

- **Normalization**: In 3NF. All attributes depend on COUNTRY_CODE.
- **Cardinality**:
  - **1:1 with COUNTRY**: One ban record per country.
- **Real-Time Usage**: Identifies regulatory risks for crypto businesses and compliance strategies.

13. USER_AMOUNT_IN_BANNED_COUNTRY

- **Description**: Tracks user counts in banned countries annually.
- **Attributes**:
  - YEAR (INT, PK): Year of data.
  - COUNTRY_CODE (VARCHAR(50), PK): References COUNTRY.
  - USER_AMOUNT (DECIMAL(38,20)): User count in millions.
- **Normalization**: In 3NF. Composite PK (YEAR, COUNTRY_CODE) ensures no redundancy.
- **Cardinality**:
  - **N:1 with COUNTRY**: Multiple user records per country over different years.
- **Real-Time Usage**: Monitors illicit crypto usage in restricted regions for regulatory enforcement.

14. ACCEPTED_COUNTRYWISE_MOST_USED_CRYPTO

- **Description**: Tracks the most-used cryptocurrencies in accepted countries annually.
- **Attributes**:
  - YEAR (INT, PK): Year of data.
  - COUNTRY_CODE (VARCHAR(50), PK): References COUNTRY.
  - CRYPTO_SYMBOL (VARCHAR(10), PK): References CRYPTO.
  - USER_PERCENTAGE (DECIMAL(10,5), CHECK <= 100): Percentage of users.
- **Normalization**: In 3NF. Composite PK ensures uniqueness.
- **Cardinality**:
  - **N:1 with COUNTRY, CRYPTO**: Multiple records per country and cryptocurrency.
- **Real-Time Usage**: Identifies popular cryptocurrencies by region for targeted marketing and adoption strategies.

15. BLOCK_REWARD_EMISSION_TYPE

- **Description**: Defines types of block reward emission (e.g., halving, tail emission).
- **Attributes**:
  - TYPE (VARCHAR(50), PK): Emission type.
- **Normalization**: In 3NF. Single attribute table.
- **Cardinality**:
  - **1:N with REWARD_DETAILS**: One emission type applies to multiple cryptocurrencies.
- **Real-Time Usage**: Classifies emission models for supply and price impact analysis.

16. REWARD_DETAILS

- **Description**: Stores block reward details for cryptocurrencies.
- **Attributes**:
  - SYMBOL (VARCHAR(10), PK): References CRYPTO.
  - EMISSION_TYPE (VARCHAR(50)): References BLOCK_REWARD_EMISSION_TYPE.
  - EMISSION_TIME (DECIMAL(38,0)): Emission duration.

    - STARTING_TIME_BLOCK_REWARD, CURRENT_BLOCK_REWARD (DECIMAL(38,5)): Reward amounts.
    - BLOCK_REWARD_TIME (DECIMAL(38,30)): Time per reward.
- **Normalization**: In 3NF. All attributes depend on SYMBOL.
- **Cardinality**:
    - **1:1 with CRYPTO**: One reward detail per cryptocurrency.
    - **N:1 with BLOCK_REWARD_EMISSION_TYPE**: Multiple cryptocurrencies per emission type.
- **Real-Time Usage**: Analyzes mining incentives and supply dynamics for price forecasting.

17. BLOCK_REWARD_EMISSION

- **Description**: Tracks block reward changes (e.g., halving events) annually.
- **Attributes**:
    - SYMBOL (VARCHAR(10), PK): References CRYPTO.
    - YEAR (INT, PK): Year of event.
    - DATE (DATE): Event date.
    - BLOCK_REWARD (DECIMAL(38,10)): Reward amount.
    - HALVING_YEAR_MARKET_PRICE, HALVING_YEAR_MARKET_CAP (DECIMAL(38,20)): Market metrics during halving.
    - NETWORK_HASH_RATE (DECIMAL(38,0)): Hash rate.
- **Normalization**: In 3NF. Composite PK (SYMBOL, YEAR) ensures no redundancy.
- **Cardinality**:
    - **N:1 with CRYPTO**: Multiple emission records per cryptocurrency.
- **Real-Time Usage**: Predicts price impacts of halving events for investment strategies.

18. HFT_AMF_FIRMS

- **Description**: Stores details of high-frequency trading and asset management firms.
- **Attributes**:
    - COMPANY_NAME (VARCHAR(200), PK): Firm name.
    - HEAD_QUARTER (VARCHAR(200)): Location.
    - ESTABLISHED_YEAR (INT): Founding year.
    - WORK_TYPE (VARCHAR(500)): Type of work.
    - FAMOUS_FOR (VARCHAR(500)): Notable achievements.
- **Normalization**: In 3NF. All attributes depend on COMPANY_NAME.
- **Cardinality**:
    - **1:N with CRYPTO_ETF**: One firm manages multiple ETFs.
- **Real-Time Usage**: Tracks firms influencing crypto markets for investor due diligence.

19. ETF_INVESTMENT_TYPE

- **Description**: Defines types of crypto ETF investments (e.g., spot, futures).
- **Attributes**:
    - TYPE (VARCHAR(200), PK): Investment type.
    - DESCRIPTION (TEXT): Type explanation.

- **Normalization**: In 3NF. No dependencies.
- **Cardinality**:
    - **1:N with CRYPTO_ETF**: One investment type applies to multiple ETFs.
- **Real-Time Usage**: Classifies ETFs for investor risk assessment and regulatory compliance.

20. CRYPTO_ETF

- **Description**: Stores details of cryptocurrency ETFs.
- **Attributes**:
    - ETF_NAME (VARCHAR(300)): ETF name.
    - ETF_CODE (VARCHAR(200), PK): Unique code.
    - COMPANY_NAME (VARCHAR(200)): References HFT_AMF_FIRMS.
    - LAUNCH_DATE (DATE): Launch date.
    - YEAR (INT): Launch year.
    - TOTAL_AUM_UNDER_ETF (DECIMAL(38,20)): Assets under management.
    - CRYPTO_SYMBOL (VARCHAR(10), PK): References CRYPTO.
    - ETF_INVESTMENT_TYPE (VARCHAR(200)): References ETF_INVESTMENT_TYPE.
    - EXPENSE_RATIO (DECIMAL(10,5), CHECK < 100): Fee percentage.
- **Normalization**: In 3NF. Composite PK (ETF_CODE, CRYPTO_SYMBOL) ensures no redundancy.
- **Cardinality**:
    - **N:1 with CRYPTO, HFT_AMF_FIRMS, ETF_INVESTMENT_TYPE**: Multiple ETFs per cryptocurrency, firm, or investment type.
- **Real-Time Usage**: Tracks ETF performance and fees for investment decisions and market analysis.

21. BROKERAGE

- **Description**: Stores details of crypto brokerages.
- **Attributes**:
    - NAME (VARCHAR(200), PK): Brokerage name.
    - HEADQUARTER (VARCHAR(200)): Location.
    - ESTABLISHED_YEAR (INT): Founding year.
    - OWN_CRYPTO_CURRENCY (VARCHAR(10)): Associated cryptocurrency.
    - FOUNDER_NAME (VARCHAR(200)): Founder.
- **Normalization**: In 3NF. All attributes depend on NAME.
- **Cardinality**:
    - **1:N with TOP_BROKERAGE, CONTROVERSY**: One brokerage has multiple performance or controversy records.
- **Real-Time Usage**: Evaluates brokerage reliability and market influence for investor trust.

22. TOP_BROKERAGE

- **Description**: Tracks top brokerages annually by market cap and user base.
- **Attributes**:
    - YEAR (INT, PK): Year of data.
    - BROKERAGE_NAME (VARCHAR(200), PK): References BROKERAGE.

    - TOTAL_MARKET_CAP, MARKET_SHARE, TOTAL_USER (DECIMAL(30,5)): Performance metrics.
- **Normalization**: In 3NF. Composite PK (BROKERAGE_NAME, YEAR) ensures no redundancy.
- **Cardinality**:
    - **N:1 with BROKERAGE, TOTAL_USER_DISTRIBUTION**: Multiple records per brokerage or year.
- **Real-Time Usage**: Identifies leading brokerages for investor trust and market analysis.

23. CONTROVERSY

- **Description**: Records controversies involving brokerages and affected cryptocurrencies.
- **Attributes**:
    - YEAR (INT): Year of controversy.
    - BROKERAGE_NAME (VARCHAR(200)): References BROKERAGE.
    - CONTROVERSY_DETAIL (VARCHAR(400)): Details of the issue.
    - AFFECTED_CRYPTO (VARCHAR(10)): References CRYPTO.
    - AFFECTED_AMOUNT_IN_BILLION (DECIMAL(38,10)): Financial impact.
- **Normalization**: In 2NF. Lacks a PK, risking duplicates. Should include YEAR and BROKERAGE_NAME as a composite PK.
- **Cardinality**:
    - **N:1 with BROKERAGE, CRYPTO**: Multiple controversies per brokerage or cryptocurrency.
- **Real-Time Usage**: Tracks risks and reputational issues for risk management and investor due diligence.

Complex Engineering Problem Project Mapping Report (Washington Accord)

This report maps the database project to the Washington Accord's **Knowledge Profile (K1-K8)**, **Complex Engineering Problem Solving Skills (P1-P7)**, and **Complex Engineering Activities (A1-A5)**, using the provided slides as reference. Each attribute is tied to specific tables and explained in the context of the project.

Knowledge Profile (K1-K8)

- **K1: A systematic, theory-based understanding of the natural sciences applicable to the discipline**
    - **Attribute**: ELECTRICITY_COST_PER_BLOCK and HEAT_IMMERSION_PER_TX in the CRYPTO_CURRENCY_PERFORMANCE_METRICS table.
    - **How Applied**: These attributes require understanding of physics (energy consumption, heat transfer) and mathematics (cost calculations) to model the environmental impact of blockchain operations, aligning with natural sciences principles.
- **K2: Conceptually based mathematics, numerical analysis, statistics, and the formal aspects of computer and information science**
    - **Attribute**: DOMINANCE (FLOAT, CHECK <= 100) in the MARKET_DOMINANCE table and NETWORK_HASH_RATE in the BLOCK_REWARD_EMISSION table.
    - **How Applied**: Calculating market dominance involves statistical analysis, while hash rate computations require numerical modeling, both rooted in computer science and mathematics.
- **K3: A systematic, theory-based formulation of engineering fundamentals**
    - **Attribute**: CONSENSUS_ALGORITHM_TYPE in the CRYPTO and HASH_ALGO_NAME tables.
    - **How Applied**: Modeling consensus mechanisms (e.g., PoW, PoS) requires engineering fundamentals of distributed systems and cryptography, ensuring accurate representation of blockchain operations.
- **K4: Engineering specialist knowledge that provides theoretical frameworks**
    - **Attribute**: EMISSION_TYPE in the REWARD_DETAILS table and BLOCK_REWARD_EMISSION_TYPE table.
    - **How Applied**: Understanding block reward emission models (e.g., halving) requires specialized knowledge of blockchain economics and tokenomics, providing a theoretical framework for supply dynamics.
- **K5: Knowledge that supports engineering design**
    - **Attribute**: FK relationships in the CRYPTO table (e.g., BLOCKCHAIN_ACCESS_TYPE, BLOCKCHAIN_TOKEN_TYPE).
    - **How Applied**: Designing a normalized schema with FKs supports efficient data retrieval and integrity, crucial for engineering a scalable database system.
- **K6: Knowledge of engineering practice (technology)**
    - **Attribute**: HARDWARE_TYPE in the HASH_ALGO_NAME table.
    - **How Applied**: Specifying hardware (e.g., ASIC, GPU) for mining reflects practical knowledge of blockchain technology and its computational requirements.
- **K7: Comprehension of the role of engineering in society**
    - **Attribute**: CRYPTO_STATUS in the COUNTRY table and CONTROVERSY_DETAIL in the CONTROVERSY table.

    - **How Applied**: These attributes address regulatory, ethical, and social impacts of cryptocurrencies, such as public safety and economic implications, aligning with engineering's societal role.
- **K8: Engagement with selected knowledge in the research literature**
    - **Attribute**: ENERGY_EFFICIENCY in the HASH_ALGO_NAME table.
    - **How Applied**: Assessing energy efficiency requires engaging with research on sustainable blockchain technologies, ensuring the project aligns with current environmental studies.

Complex Engineering Problem Solving Skills (P1-P7)

- **P1: Cannot be resolved without in-depth engineering knowledge**
    - **Attribute**: ELECTRICITY_COST_PER_BLOCK and HEAT_IMMERSION_PER_TX in the CRYPTO_CURRENCY_PERFORMANCE_METRICS table.
    - **How Applied**: Calculating energy costs and heat per transaction requires deep knowledge of electrical engineering and thermodynamics, as these are not trivial metrics and involve complex modeling.
- **P2: Involve wide-ranging or conflicting technical, engineering, and other issues**
    - **Attribute**: CRYPTO_STATUS in the COUNTRY table and RESTRICTIONS in the ACCEPTED_COUNTRY and BANNED_COUNTRY tables.
    - **How Applied**: Balancing regulatory compliance (legal issues) with technical implementation (blockchain accessibility) involves conflicting requirements, such as privacy versus transparency.
- **P3: Have no obvious solution and require abstract thinking**
    - **Attribute**: DOMINANCE in the MARKET_DOMINANCE table.
    - **How Applied**: Calculating market dominance requires abstract modeling of market share, with no obvious formula, as it involves dynamic market data and competitive analysis.
- **P4: Involve infrequently encountered issues**
    - **Attribute**: CONTROVERSY_DETAIL in the CONTROVERSY table.
    - **How Applied**: Controversies in crypto markets (e.g., hacks, fraud) are infrequent but impactful, requiring unique risk assessment and mitigation strategies.

- **P5: Are outside problems encompassed by standards and codes**
    - **Attribute**: BLOCK_REWARD_EMISSION table's HALVING_YEAR_MARKET_PRICE and HALVING_YEAR_MARKET_CAP.
    - **How Applied**: Halving events and their market impacts are not governed by standard financial codes, requiring custom analysis beyond traditional frameworks.
- **P6: Involve diverse groups of stakeholders with widely varying needs**
    - **Attribute**: TOTAL_USER_DISTRIBUTION table's regional user attributes (e.g., ASIA_USER, EUROPE_USER).

    - **How Applied**: The table addresses the needs of diverse stakeholders (investors, regulators, developers) with varying interests in regional adoption trends and market growth.
- **P7: Are high-level problems including many component parts or sub-problems**
    - **Attribute**: Multiple FKs in the CRYPTO table (e.g., BLOCKCHAIN_ACCESS_TYPE, CONSENSUS_ALGORITHM_TYPE).
    - **How Applied**: The CRYPTO table integrates multiple sub-problems (access type, consensus mechanism, token type), forming a high-level system for crypto analysis.

Complex Engineering Activities (A1-A5)

- **A1: Involve the use of diverse resources**
    - **Attribute**: CRYPTO_ETF table's TOTAL_AUM_UNDER_ETF and COMPANY_NAME.
    - **How Applied**: Managing ETF data involves diverse resources, including financial data (AUM), human resources (firms), and technology (database systems), to support investment analysis.
- **A2: Require resolution of significant problems arising from interactions**
    - **Attribute**: HASH_ALGO_NAME table's ENERGY_EFFICIENCY and CRYPTO table's CONSENSUS_ALGORITHM_TYPE.
    - **How Applied**: Balancing energy efficiency (environmental concern) with consensus mechanisms (technical requirement) resolves conflicts between sustainability and performance.
- **A3: Involve creative use of engineering principles**
    - **Attribute**: BLOCK_REWARD_EMISSION_TYPE and REWARD_DETAILS tables' emission models.
    - **How Applied**: Modeling emission types (e.g., halving) creatively applies engineering principles to predict supply dynamics and market impacts, a novel challenge in blockchain.

- **A4: Have significant consequences in a range of contexts**
    - **Attribute**: CONTROVERSY table's AFFECTED_AMOUNT_IN_BILLION and COUNTRY table's CRYPTO_STATUS.
    - **How Applied**: Controversies can impact financial markets, while regulatory status affects global adoption, both with significant economic and social consequences.
- **A5: Can extend beyond previous experiences by applying principles-based approaches**
    - **Attribute**: ACCEPTED_COUNTRYWISE_MOST_USED_CRYPTO table's USER_PERCENTAGE.

- **How Applied**: Analyzing crypto usage by country extends beyond traditional financial analysis, using principles-based data modeling to explore new adoption patterns.

QUERIES

Question 1 :

Write a query to display the cryptocurrencies whose transaction fees are greater than or equal to 1 USD and show them in ascending order.

Query:

```
SELECT * FROM CRYPTO_CURRENCY_PERFORMANCE_METRICS WHERE
CRYPTO_CURRENCY_PERFORMANCE_METRICS.AVERAGE_TRX_FEE>=1 ORDER BY
AVERAGE_TRX_FEE ASC;
```

Results Messages

	SYMBOL	TRANSACTION_PER_SECOND	AVERAGE_TRX_FEE	ELECTRICITY_COST_PER_BLOCK	HEAT_IMMERSION_PER_TX	HASH_RATE_PER_UNIT	TOTAL_USERS
1	DAI	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	500000
2	ETH	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	500000
3	GRT	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	400000
4	LDO	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	300000
5	LINK	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	600000
6	MANA	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	300000
7	MKR	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	300000
8	ONDO	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	200000
9	SAND	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	400000
10	SHIB	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	1000000
11	USDC	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	8000000
12	USDT	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	10000000
13	AAVE	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	400000
14	AXS	15.000000000000000	1.452000000000000	0.005000000000000	0.02	N/A	500000
15	BTC	7.000000000000000	3.025000000000000	1449.000000000000000	5216.40	2.31E+09	1000000

Question 2 :

Write a query to display the all time maximum price, all time minimum price, the date of the maximum price, the date of the minimum price, and the maximum return of any currency.

Query:

```
WITH TMP AS

(  SELECT  SYMBOL, MAX_PRICE, MIN_PRICE, MAX_PRICE_DATE, MIN_PRICE_DATE,

   (MAX_PRICE - MIN_PRICE) * 100 / NULLIF(MIN_PRICE, 0) AS MAX_RETURN

  //-- Added NULLIF to avoid division by zero

   FROM CRYPTO  )  SELECT * FROM TMP WHERE SYMBOL = 'BTC';
```

Results | Messages

	SYMBOL	MAX_PRICE	MIN_PRICE	MAX_PRICE_DATE	MIN_PRICE_DATE	MAX_RETURN
1	BTC	180000.000000000000000	0.048650000000000	2025-03-31	2010-07-14	369989622.507708

Question 3 :

Write a query to display the brokerages have their headquarters in the countries where cryptocurrency is accepted and legal.

Query:

```
SELECT   BROKERAGE.NAME, BROKERAGE.HEADQUARTER,  COUNTRY.CRYPTO_STATUS

FROM   BROKERAGE JOIN  COUNTRY  ON

BROKERAGE.HEADQUARTER LIKE '%' + COUNTRY.COUNTRY_NAME

  //-- BROKERAGE.HEADQUARTER LIKE '%' + COUNTRY.COUNTRY_NAME + '%'

WHERE  COUNTRY.CRYPTO_STATUS = 'ACCEPTED';
```

Results | Messages

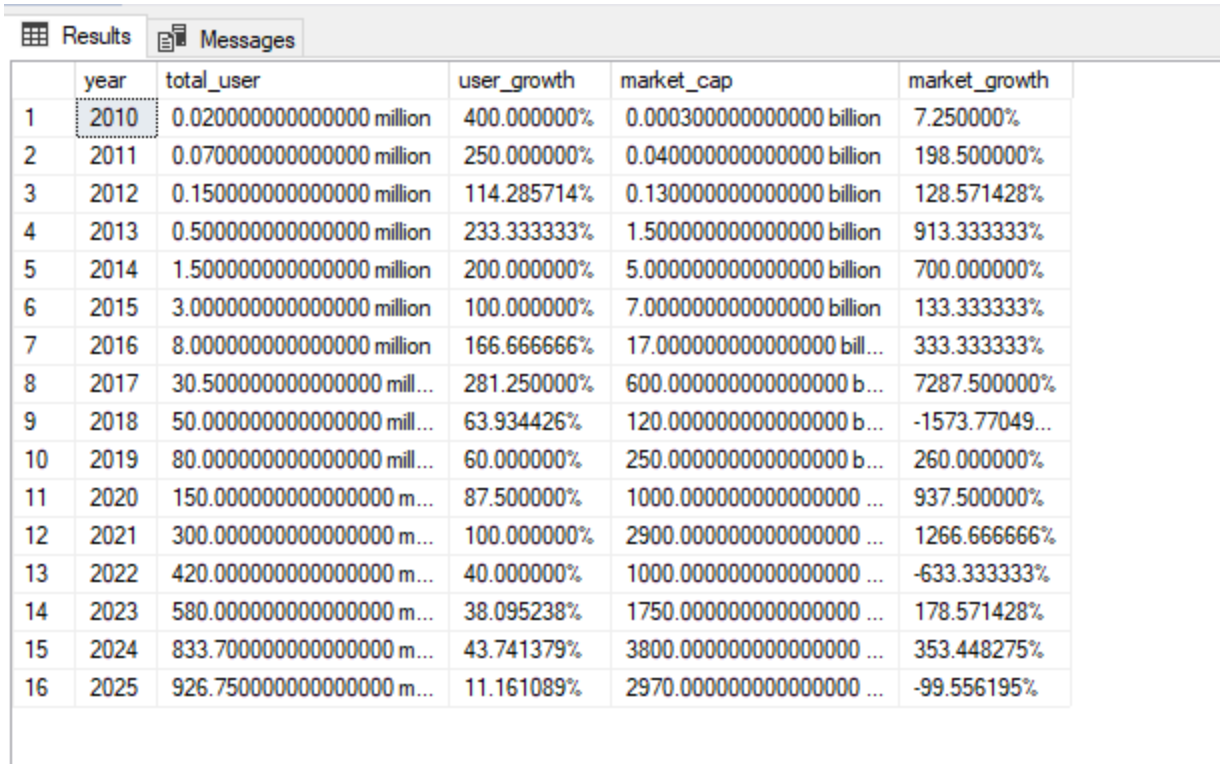
	NAME	HEADQUARTER	CRYPTO_STATUS
1	FTX	Nassau, Bahamas	ACCEPTED
2	Binance	George Town, Cayman Islands	ACCEPTED
3	Gate.io	George Town, Cayman Islands	ACCEPTED
4	Capital.com	Limassol, Cyprus	ACCEPTED
5	Bitfinex	Hong Kong	ACCEPTED
6	AvaTrade	Dublin, Ireland	ACCEPTED
7	eToro	Tel Aviv, Israel	ACCEPTED
8	Mt. Gox	Shibuya, Tokyo, Japan	ACCEPTED
9	Bitstamp	Luxembourg City, Luxembourg	ACCEPTED
10	Crypto.com	Singapore	ACCEPTED
11	NiceHash	Ljubljana, Slovenia	ACCEPTED
12	Bitget	Victoria, Seychelles	ACCEPTED
13	KuCoin	Victoria, Seychelles	ACCEPTED
14	OKX	Victoria, Seychelles	ACCEPTED

Question 4 :

Write a query to display the yearly growth in the number of crypto users increased or decreased, the market cap growth increased or decreased, and the percentage growth of users and market cap increased or decreased.

Query:

```
SELECT   T2.year,

   CAST(T2.TOTAL_USER_IN_WORD AS VARCHAR) + ' million' AS total_user,

   CAST(((T2.TOTAL_USER_IN_WORD - T1.TOTAL_USER_IN_WORD) * 100.0 / T1.TOTAL_USER_IN_WORD)
AS VARCHAR) + '%' AS user_growth,

   CAST(T2.total_market_cap AS VARCHAR) + ' billion' AS market_cap,

   CAST(((T2.total_market_cap - T1.total_market_cap) * 100.0 / T1.TOTAL_USER_IN_WORD) AS
VARCHAR) + '%' AS market_growth

FROM Total_User_Distribution T1 JOIN  Total_User_Distribution T2 ON T2.year = T1.year + 1
```



Results | Messages

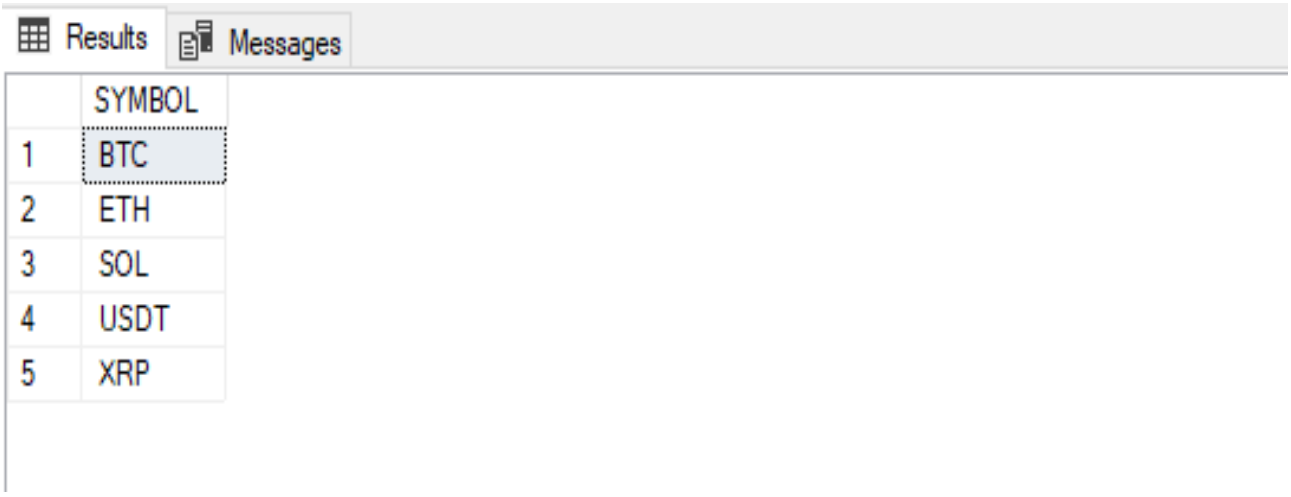
	year	total_user	user_growth	market_cap	market_growth
1	2010	0.020000000000000 million	400.000000%	0.000300000000000 billion	7.250000%
2	2011	0.070000000000000 million	250.000000%	0.040000000000000 billion	198.500000%
3	2012	0.150000000000000 million	114.285714%	0.130000000000000 billion	128.571428%
4	2013	0.500000000000000 million	233.333333%	1.500000000000000 billion	913.333333%
5	2014	1.500000000000000 million	200.000000%	5.000000000000000 billion	700.000000%
6	2015	3.000000000000000 million	100.000000%	7.000000000000000 billion	133.333333%
7	2016	8.000000000000000 million	166.666666%	17.000000000000000 bill...	333.333333%
8	2017	30.500000000000000 mill...	281.250000%	600.000000000000000 b...	7287.500000%
9	2018	50.000000000000000 mill...	63.934426%	120.000000000000000 b...	-1573.77049...
10	2019	80.000000000000000 mill...	60.000000%	250.000000000000000 b...	260.000000%
11	2020	150.000000000000000 m...	87.500000%	1000.000000000000000 ...	937.500000%
12	2021	300.000000000000000 m...	100.000000%	2900.000000000000000 ...	1266.666666%
13	2022	420.000000000000000 m...	40.000000%	1000.000000000000000 ...	-633.333333%
14	2023	580.000000000000000 m...	38.095238%	1750.000000000000000 ...	178.571428%
15	2024	833.700000000000000 m...	43.741379%	3800.000000000000000 ...	353.448275%
16	2025	926.750000000000000 m...	11.161089%	2970.000000000000000 ...	-99.556195%

Question 5 :

Write a query to display the intersection of crypto table and market dominance table.

Query:

```
//--INTERSECTION

SELECT SYMBOL FROM CRYPTO INTERSECT

SELECT SYMBOL FROM MARKET_DOMINANCE

WHERE YEAR = 2025;
```



	SYMBOL
1	BTC
2	ETH
3	SOL
4	USDT
5	XRP

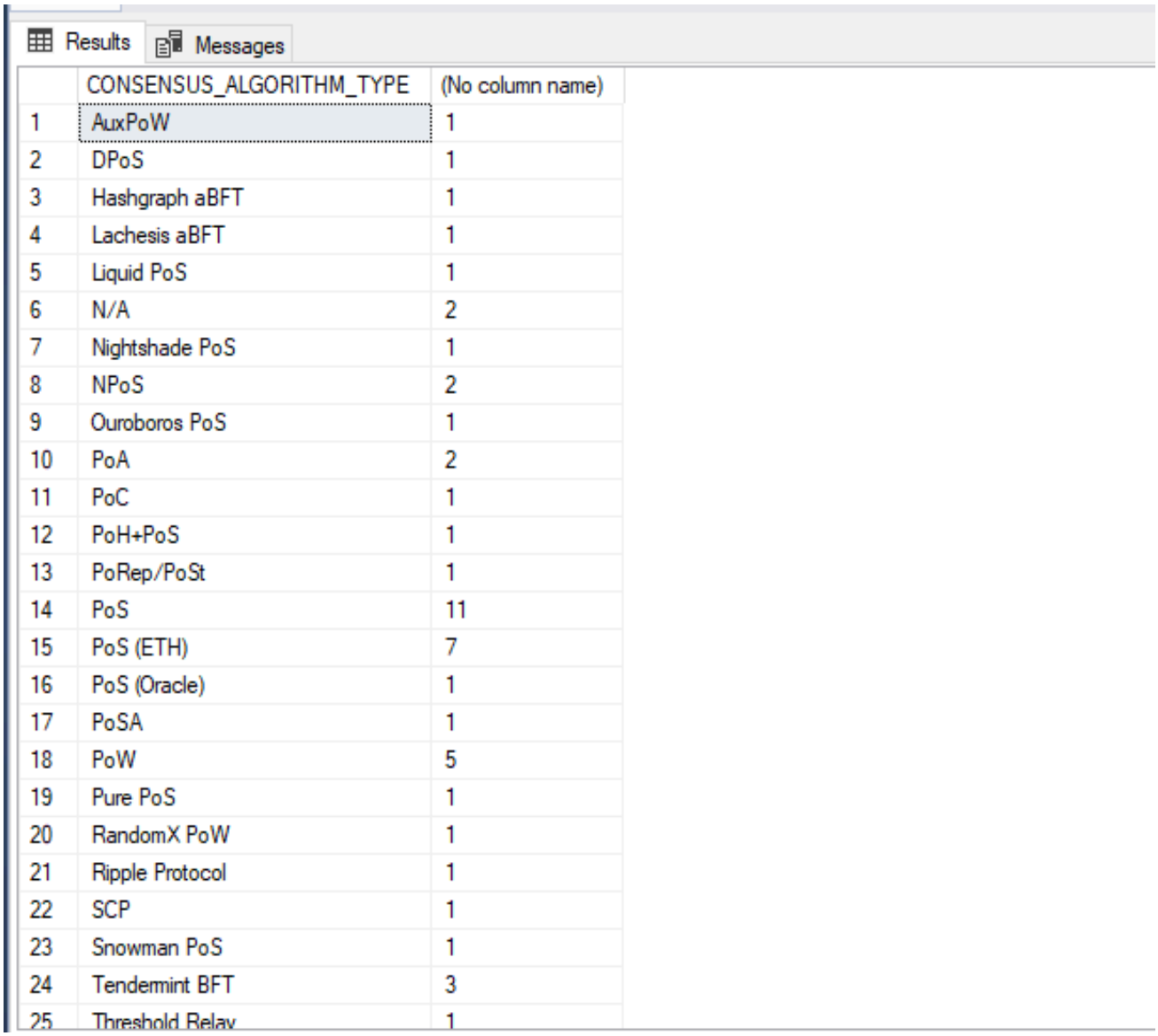
Question 6 :

Write a query to display the total number of currencies for each consensus algorithm.

Query:

--GROUP BY

SELECT CONSENSUS_ALGORITHM_TYPE,count(CONSENSUS_ALGORITHM_TYPE) from CRYPTO group by CONSENSUS_ALGORITHM_TYPE;



Results | Messages

	CONSENSUS_ALGORITHM_TYPE	(No column name)
1	AuxPoW	1
2	DPoS	1
3	Hashgraph aBFT	1
4	Lachesis aBFT	1
5	Liquid PoS	1
6	N/A	2
7	Nightshade PoS	1
8	NPoS	2
9	Ouroboros PoS	1
10	PoA	2
11	PoC	1
12	PoH+PoS	1
13	PoRep/PoSt	1
14	PoS	11
15	PoS (ETH)	7
16	PoS (Oracle)	1
17	PoSA	1
18	PoW	5
19	Pure PoS	1
20	RandomX PoW	1
21	Ripple Protocol	1
22	SCP	1
23	Snowman PoS	1
24	Tendermint BFT	3
25	Threshold Relay	1

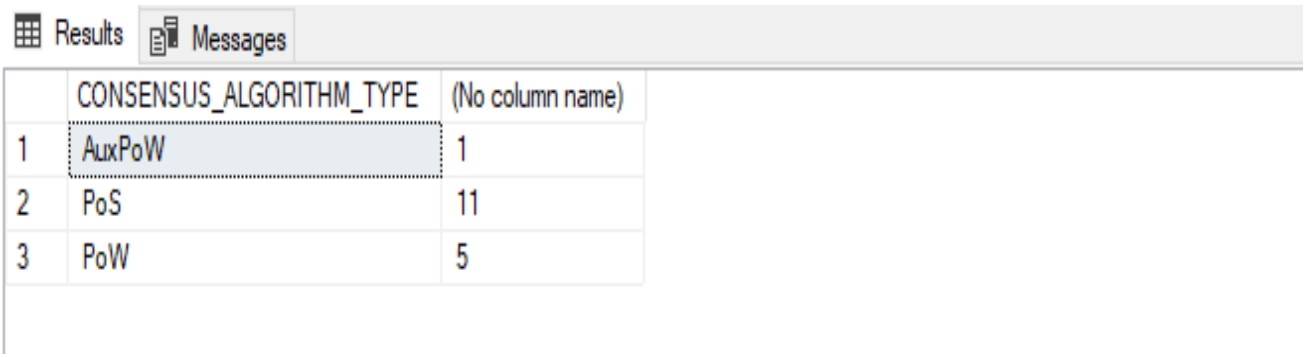
Question 7 :

Write a query to display the total number of currencies for each specific consensus algorithm. User said the consensus algorithm name. Like as: PoS,PoW, AuxPoW, PoC.

Query:

```
--HAVING
```

```
SELECT CONSENSUS_ALGORITHM_TYPE,COUNT(CONSENSUS_ALGORITHM_TYPE) FROM
CRYPTO group by CONSENSUS_ALGORITHM_TYPE

HAVING CONSENSUS_ALGORITHM_TYPE='PoW'

OR CONSENSUS_ALGORITHM_TYPE='PoS' or CONSENSUS_ALGORITHM_TYPE='AuxPoW';
```



Results Messages

	CONSENSUS_ALGORITHM_TYPE	(No column name)
1	AuxPoW	1
2	PoS	11
3	PoW	5

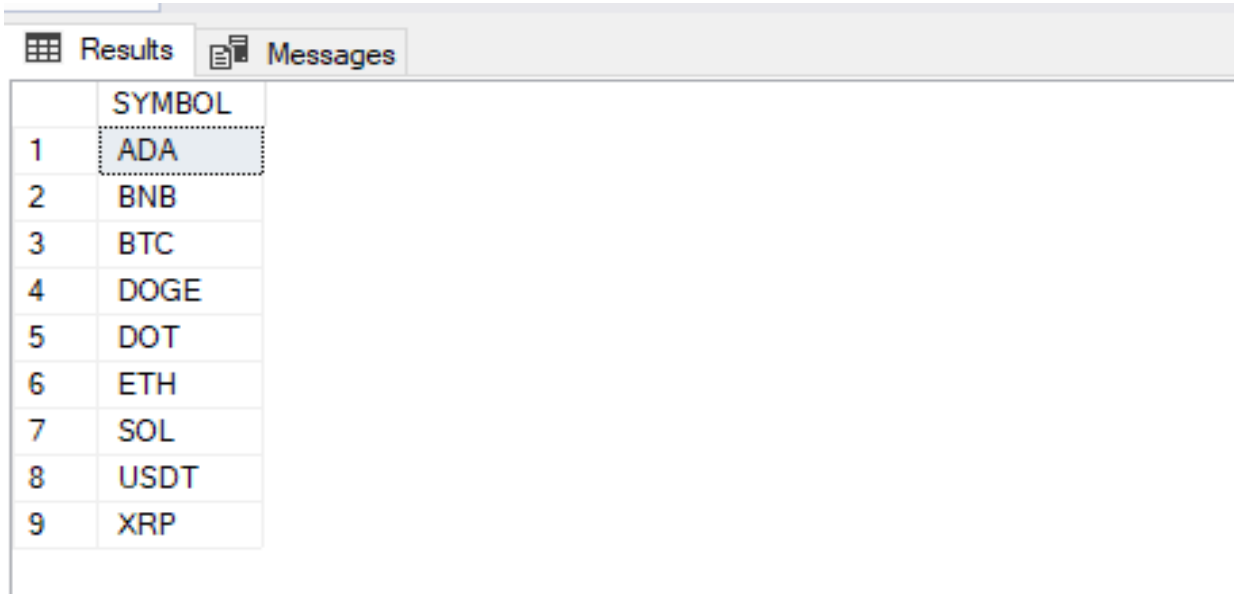
Question 8 :

Write a query to display (Combine the list of cryptocurrency symbols from countries where cryptocurrencies are accepted(ACCEPTED_COUNTRYWISE_MOST_USED_CRYPTO) and those from banned countries (USER_AMOUNT_IN_BANNED_COUNTRY) for the year 2024.

Query:

```
--UNION
```

```
SELECT CRYPTO_SYMBOL AS SYMBOL FROM
ACCEPTED_COUNTRYWISE_MOST_USED_CRYPTO

WHERE YEAR = 2024 UNION SELECT AFFECTED_CRYPTO AS SYMBOL

FROM CONTROVERSY WHERE YEAR = 2024 AND AFFECTED_CRYPTO IS NOT NULL;
```



	SYMBOL
1	ADA
2	BNB
3	BTC
4	DOGE
5	DOT
6	ETH
7	SOL
8	USDT
9	XRP

Question 9 :

Write a query to display and increase the average transaction fee (AVERAGE_TRX_FEE) by 10% for those cryptocurrencies whose average transaction fee (AVERAGE_TRX_FEE) is greater than or equal to 1.

Query:

```
UPDATE CRYPTO_CURRENCY_PERFORMANCE_METRICS
SET AVERAGE_TRX_FEE = AVERAGE_TRX_FEE * 1.10
```

```
WHERE AVERAGE_TRX_FEE > 1;
SELECT * FROM CRYPTO_CURRENCY_PERFORMANCE_METRICS
```

Results | Messages

	SYMBOL	TRANSACTION_PER_SECOND	AVERAGE_TRX_FEE	ELECTRICITY_COST_PER_BLOCK	HEAT_IMMERSION_PER_TX	HASH_RATE_PER_UNIT	TOTAL_USERS
1	AAVE	15.000000000000000	1.756920000000000	0.005000000000000	0.02	N/A	400000
2	ADA	250.000000000000000	0.050000000000000	0.000500000000000	0.00	N/A	1000000
3	ALGO	6000.000000000000000	0.001000000000000	0.000500000000000	0.00	N/A	500000
4	APT	10000.000000000000000	0.010000000000000	0.001000000000000	0.00	N/A	200000
5	ARB	40.000000000000000	0.050000000000000	0.005000000000000	0.02	N/A	600000
6	ATOM	10000.000000000000000	0.010000000000000	0.001000000000000	0.00	N/A	500000
7	AVAX	4500.000000000000000	0.020000000000000	0.001000000000000	0.00	N/A	800000
8	AXS	15.000000000000000	1.756920000000000	0.005000000000000	0.02	N/A	500000
9	BCH	7.000000000000000	0.050000000000000	200.000000000000000	720.00	1.43E+07	300000
10	BNB	100.000000000000000	0.100000000000000	0.010000000000000	0.04	N/A	5000000
11	BTC	7.000000000000000	3.660250000000000	1449.000000000000000	5216.40	2.31E+09	1000000
12	CHZ	100.000000000000000	0.010000000000000	0.001000000000000	0.00	N/A	300000
13	CRO	300.000000000000000	0.010000000000000	0.001000000000000	0.00	N/A	500000
14	DAI	15.000000000000000	1.756920000000000	0.005000000000000	0.02	N/A	500000
15	DOGE	7.000000000000000	0.500000000000000	100.000000000000000	360.00	1.67E+06	500000
16	DOT	1000.000000000000000	0.010000000000000	0.001000000000000	0.00	N/A	700000
17	ETC	7.000000000000000	0.100000000000000	150.000000000000000	540.00	6.43E+06	200000
18	ETH	15.000000000000000	1.756920000000000	0.005000000000000	0.02	N/A	500000
19	FET	1000.000000000000000	0.010000000000000	0.001000000000000	0.00	N/A	400000
20	FIL	3000.000000000000000	0.010000000000000	0.001000000000000	0.00	N/A	400000
21	FTM	300.000000000000000	0.001000000000000	0.001000000000000	0.00	N/A	500000
22	GRT	15.000000000000000	1.756920000000000	0.005000000000000	0.02	N/A	400000
23	HBAR	10000.000000000000000	0.000100000000000	0.000100000000000	0.00	N/A	400000
24	HNT	2000.000000000000000	0.001000000000000	0.001000000000000	0.00	N/A	300000
25	ICP	11000.000000000000000	0.000100000000000	0.001000000000000	0.00	N/A	500000

Question 10 :

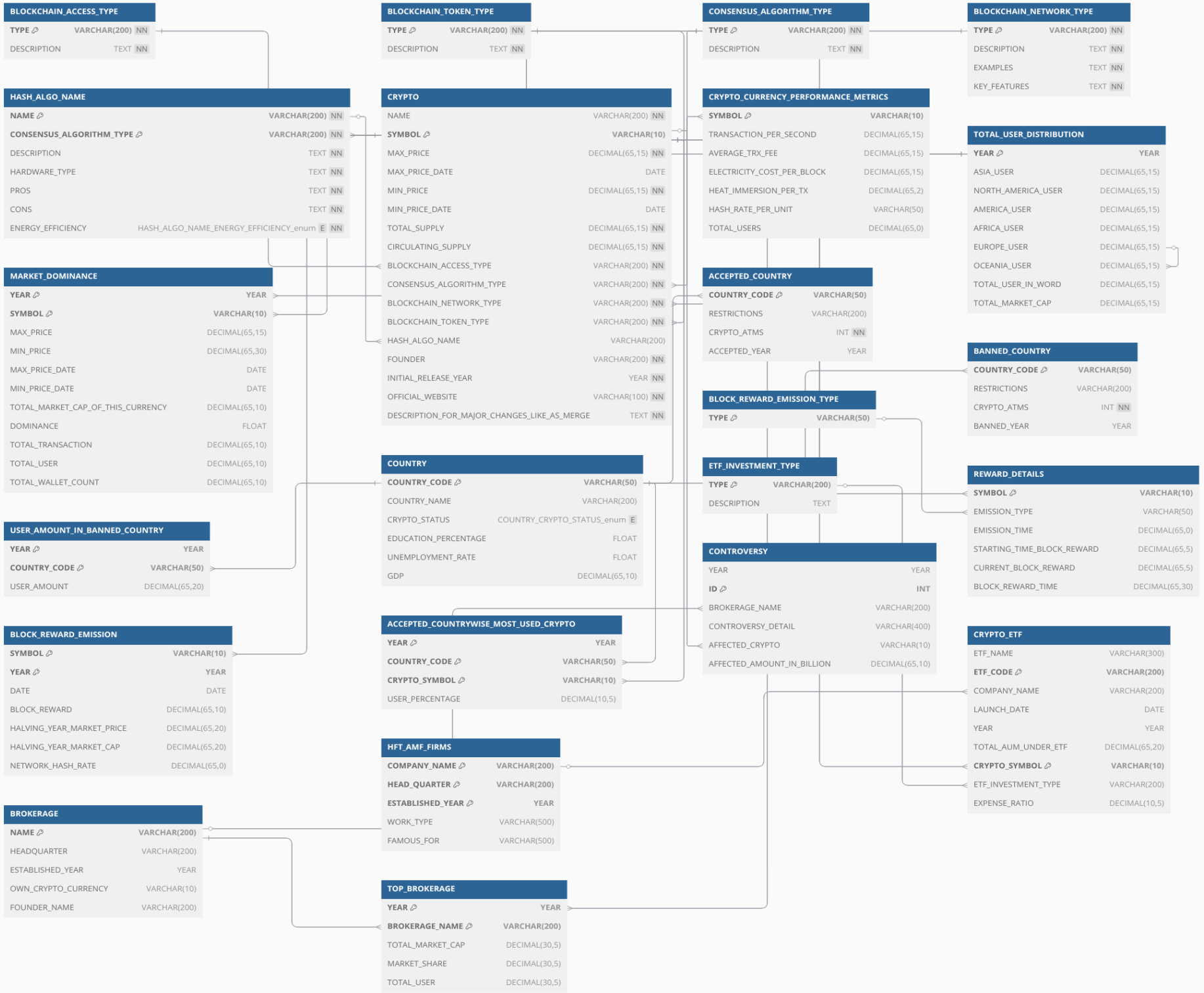
Write a query to display the cryptocurrency symbols, names, and their maximum prices, along with a price tier classification. The price tier should categorize the maximum price as 'High Price' (greater than 10,000), 'Medium Price' (between 100 and 10,000), and 'Low Price' (less than 100). Sort the results in descending order of maximum price.

Query:

```
--CASE
SELECT   SYMBOL, NAME, MAX_PRICE,
 CASE
       WHEN MAX_PRICE > 10000 THEN 'High Price'
       WHEN MAX_PRICE BETWEEN 100 AND 10000 THEN 'Medium Price'
       ELSE 'Low Price'
   END AS PRICE_TIER FROM CRYPTO ORDER BY MAX_PRICE DESC;
```

Results | Messages

	SYMBOL	NAME	MAX_PRICE	PRICE_TIER
1	BTC	Bitcoin	180000.000000000000000	High Price
2	ETH	Ethereum	6000.000000000000000	Medium Price
3	ZEC	Zcash	5941.800000000000000	Medium Price
4	MKR	Maker	4095.000000000000000	Medium Price
5	BCH	Bitcoin Cash	3785.820000000000000	Medium Price
6	BNB	Binance Coin	717.480000000000000	Medium Price
7	ICP	Internet Co...	700.650000000000000	Medium Price
8	AAVE	Aave	661.690000000000000	Medium Price
9	KSM	Kusama	621.710000000000000	Medium Price
10	XMR	Monero	542.330000000000000	Medium Price
11	LTC	Litecoin	410.260000000000000	Medium Price
12	SOL	Solana	259.960000000000000	Medium Price
13	FIL	Filecoin	236.840000000000000	Medium Price
14	ETC	Ethereum C...	167.090000000000000	Medium Price
15	AXS	Axie Infinity	164.900000000000000	Medium Price
16	AVAX	Avalanche	144.960000000000000	Medium Price
17	DOT	Polkadot	54.980000000000000	Low Price
18	HNT	Helium	54.880000000000000	Low Price
19	LINK	Chainlink	52.700000000000000	Low Price
20	INJ	Injective	44.950000000000000	Low Price
21	ATOM	Cosmos	44.450000000000000	Low Price
22	NEAR	NEAR Prot...	20.440000000000000	Low Price
23	APT	Aptos	20.250000000000000	Low Price
24	XTZ	Tezos	9.120000000000000	Low Price
25	SAND	The Sandbox	8.400000000000000	Low Price


BLOCKCHAIN_ACCESS_TYPE
TYPE VARCHAR(200) NN
DESCRIPTION TEXT NN
BLOCKCHAIN_TOKEN_TYPE
TYPE VARCHAR(200) NN
DESCRIPTION TEXT NN
CONSENSUS_ALGORITHM_TYPE
TYPE VARCHAR(200) NN
DESCRIPTION TEXT NN
BLOCKCHAIN_NETWORK_TYPE
TYPE VARCHAR(200) NN
DESCRIPTION TEXT NN
EXAMPLES TEXT NN
KEY_FEATURES TEXT NN
HASH_ALGO_NAME
NAME VARCHAR(200) NN
CONSENSUS_ALGORITHM_TYPE VARCHAR(200) NN
DESCRIPTION TEXT NN
HARDWARE_TYPE TEXT NN
PROS TEXT NN
CONS TEXT NN
ENERGY_EFFICIENCY HASH_ALGO_NAME_ENERGY_EFFICIENCY_enum E NN
CRYPTO
NAME VARCHAR(200) NN
SYMBOL VARCHAR(10)
MAX_PRICE DECIMAL(65,15) NN
MAX_PRICE_DATE DATE
MIN_PRICE DECIMAL(65,15) NN
MIN_PRICE_DATE DATE
TOTAL_SUPPLY DECIMAL(65,15) NN
CIRCULATING_SUPPLY DECIMAL(65,15) NN
BLOCKCHAIN_ACCESS_TYPE VARCHAR(200) NN
CONSENSUS_ALGORITHM_TYPE VARCHAR(200) NN
BLOCKCHAIN_NETWORK_TYPE VARCHAR(200) NN
BLOCKCHAIN_TOKEN_TYPE VARCHAR(200) NN
HASH_ALGO_NAME VARCHAR(200)
FOUNDER VARCHAR(200) NN
INITIAL_RELEASE_YEAR YEAR NN
OFFICIAL_WEBSITE VARCHAR(100) NN
DESCRIPTION_FOR_MAJOR_CHANGES_LIKE_AS_MERGE TEXT NN
CRYPTO_CURRENCY_PERFORMANCE_METRICS
SYMBOL VARCHAR(10)
TRANSACTION_PER_SECOND DECIMAL(65,15)
AVERAGE_TRX_FEE DECIMAL(65,15)
ELECTRICITY_COST_PER_BLOCK DECIMAL(65,15)
HEAT_IMMERSION_PER_TX DECIMAL(65,2)
HASH_RATE_PER_UNIT VARCHAR(50)
TOTAL_USERS DECIMAL(65,0)
TOTAL_USER_DISTRIBUTION
YEAR YEAR
ASIA_USER DECIMAL(65,15)
NORTH_AMERICA_USER DECIMAL(65,15)
AMERICA_USER DECIMAL(65,15)
AFRICA_USER DECIMAL(65,15)
EUROPE_USER DECIMAL(65,15)
OCEANIA_USER DECIMAL(65,15)
TOTAL_USER_IN_WORD DECIMAL(65,15)
TOTAL_MARKET_CAP DECIMAL(65,15)
MARKET_DOMINANCE
YEAR YEAR
SYMBOL VARCHAR(10)
MAX_PRICE DECIMAL(65,15)
MIN_PRICE DECIMAL(65,30)
MAX_PRICE_DATE DATE
MIN_PRICE_DATE DATE
TOTAL_MARKET_CAP_OF_THIS_CURRENCY DECIMAL(65,10)
DOMINANCE FLOAT
TOTAL_TRANSACTION DECIMAL(65,10)
TOTAL_USER DECIMAL(65,10)
TOTAL_WALLET_COUNT DECIMAL(65,10)
ACCEPTED_COUNTRY
COUNTRY_CODE VARCHAR(50)
RESTRICTIONS VARCHAR(200)
CRYPTO_ATMS INT NN
ACCEPTED_YEAR YEAR
BANNED_COUNTRY
COUNTRY_CODE VARCHAR(50)
RESTRICTIONS VARCHAR(200)
CRYPTO_ATMS INT NN
BANNED_YEAR YEAR
BLOCK_REWARD_EMISSION_TYPE
TYPE VARCHAR(50)
COUNTRY
COUNTRY_CODE VARCHAR(50)
COUNTRY_NAME VARCHAR(200)
CRYPTO_STATUS COUNTRY_CRYPTO_STATUS_enum E
EDUCATION_PERCENTAGE FLOAT
UNEMPLOYMENT_RATE FLOAT
GDP DECIMAL(65,10)
ETF_INVESTMENT_TYPE
TYPE VARCHAR(200)
DESCRIPTION TEXT
REWARD_DETAILS
SYMBOL VARCHAR(10)
EMISSION_TYPE VARCHAR(50)
EMISSION_TIME DECIMAL(65,0)
STARTING_TIME_BLOCK_REWARD DECIMAL(65,5)
CURRENT_BLOCK_REWARD DECIMAL(65,5)
BLOCK_REWARD_TIME DECIMAL(65,30)
USER_AMOUNT_IN_BANNED_COUNTRY
YEAR YEAR
COUNTRY_CODE VARCHAR(50)
USER_AMOUNT DECIMAL(65,20)
CONTROVERSY
YEAR YEAR
ID INT
BROKERAGE_NAME VARCHAR(200)
CONTROVERSY_DETAIL VARCHAR(400)
AFFECTED_CRYPTO VARCHAR(10)
AFFECTED_AMOUNT_IN_BILLION DECIMAL(65,10)
BLOCK_REWARD_EMISSION
SYMBOL VARCHAR(10)
YEAR YEAR
DATE DATE
BLOCK_REWARD DECIMAL(65,10)
HALVING_YEAR_MARKET_PRICE DECIMAL(65,20)
HALVING_YEAR_MARKET_CAP DECIMAL(65,20)
NETWORK_HASH_RATE DECIMAL(65,0)
ACCEPTED_COUNTRYWISE_MOST_USED_CRYPTO
YEAR YEAR
COUNTRY_CODE VARCHAR(50)
CRYPTO_SYMBOL VARCHAR(10)
USER_PERCENTAGE DECIMAL(10,5)
CRYPTO_ETF
ETF_NAME VARCHAR(300)
ETF_CODE VARCHAR(200)
COMPANY_NAME VARCHAR(200)
LAUNCH_DATE DATE
YEAR YEAR
TOTAL_AUM_UNDER_ETF DECIMAL(65,20)
CRYPTO_SYMBOL VARCHAR(10)
ETF_INVESTMENT_TYPE VARCHAR(200)
EXPENSE_RATIO DECIMAL(10,5)
HFT_AMF_FIRMS
COMPANY_NAME VARCHAR(200)
HEAD_QUARTER VARCHAR(200)
ESTABLISHED_YEAR YEAR
WORK_TYPE VARCHAR(500)
FAMOUS_FOR VARCHAR(500)
BROKERAGE
NAME VARCHAR(200)
HEADQUARTER VARCHAR(200)
ESTABLISHED_YEAR YEAR
OWN_CRYPTO_CURRENCY VARCHAR(10)
FOUNDER_NAME VARCHAR(200)
TOP_BROKERAGE
YEAR YEAR
BROKERAGE_NAME VARCHAR(200)
TOTAL_MARKET_CAP DECIMAL(30,5)
MARKET_SHARE DECIMAL(30,5)
TOTAL_USER DECIMAL(30,5)
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