

Analyze CSV data files with Vanna

world top companies

- <https://www.kaggle.com/datasets/patricklford/largest-companies-analysis-worldwide>

Setup

```
!pwd!pip install vanna!pip install 'vanna[chromadb]'!pip install ollama
```

```
In [1]: from glob import glob
import os
import re
from time import time
from datetime import datetime

import pandas as pd
import sqlite3

from vanna.ollama import Ollama
from vanna.chromadb.chromadb_vector import ChromaDB_VectorStore

import warnings
warnings.filterwarnings('ignore', category=DeprecationWarning, message='^Number of requested results')
# warnings.filterwarnings('ignore', category=DeprecationWarning, message=re.escape(r'^Some regex pattern'))
```

```
In [2]: class MyVanna(ChromaDB_VectorStore, Ollama):
    def __init__(self, config=None):
        ChromaDB_VectorStore.__init__(self, config=config)
        Ollama.__init__(self, config=config)
```

load SQLite db with CSV data

```
In [3]: file_db_path = "../data/company_rank.sqlite"
file_db = os.path.abspath(os.path.expanduser(file_db_path))
```

```
print(file_db)
```

/home/papagame/projects/wgong/py4kids/lesson-18-ai/vanna/note_book/data/company_rank.sqlite

```
In [4]: LOAD_CSV = True # False
if LOAD_CSV:
    csv_files = glob("../data/company_rank/*.csv")
    print(csv_files)

    conn = sqlite3.connect(file_db)
    df_dict = {}
    col_map = {}
    for i in csv_files:
        t = i.split("/")[-1].lower().replace("companies_ranked_by_", "").replace(".csv", "")
        df = pd.read_csv(i)
        c_map = {c:c.lower() for c in df.columns}
        c_map['price (GBP)'] = 'price_gbp'
        # print(f"col_map: {c_map}")
        table_name = f"t_{t}"
        print(f"\n Loading data from file: '{i}' \n into table_name: '{table_name}'")
        col_map[table_name] = c_map
        df.rename(columns=c_map, inplace=True)
        df.to_sql(table_name, conn, if_exists='replace', index=False)
        df_dict[table_name] = df
    conn.close()
```

```
['../data/company_rank/Companies_ranked_by_Market_Cap.csv', '../data/company_rank/Companies_ranked_by_P_E_ratio.csv', '../data/company_rank/Companies_ranked_by_Dividend_Yield.csv', '../data/company_rank/Companies_ranked_by_Earnings.csv', '../data/company_rank/country_region.csv', '../data/company_rank/Companies_ranked_by_Revenue.csv']
```

```
Loading data from file: '../data/company_rank/Companies_ranked_by_Market_Cap.csv'
into table_name: 't_market_cap'
```

```
Loading data from file: '../data/company_rank/Companies_ranked_by_P_E_ratio.csv'
into table_name: 't_p_e_ratio'
```

```
Loading data from file: '../data/company_rank/Companies_ranked_by_Dividend_Yield.csv'
into table_name: 't_dividend_yield'
```

```
Loading data from file: '../data/company_rank/Companies_ranked_by_Earnings.csv'
into table_name: 't_earnings'
```

```
Loading data from file: '../data/company_rank/country_region.csv'
into table_name: 't_country_region'
```

```
Loading data from file: '../data/company_rank/Companies_ranked_by_Revenue.csv'
into table_name: 't_revenue'
```

```
In [5]: # verify
VERIFY_DB = True # False #
if VERIFY_DB:
    conn = sqlite3.connect(file_db)
    sql_stmt = f"select name from {table_name} limit 10"
    sql_stmt = """
    select country from t_revenue
    UNION
    select country from t_earnings
    UNION
    select country from t_market_cap
    UNION
    select country from t_p_e_ratio
    UNION
    select country from t_dividend_yield
    """
    df_2 = pd.read_sql_query(sql_stmt, conn).fillna("")
    country_list = df_2["country"].to_list()
    # print(df_2)
    conn.close()
```

```
In [6]: country_list
```

```
Out[6]: ['',  
         'Argentina',  
         'Australia',  
         'Austria',  
         'Bahamas',  
         'Bahrain',  
         'Belgium',  
         'Bermuda',  
         'Brazil',  
         'British Virgin Islands',  
         'Cambodia',  
         'Canada',  
         'Cayman Islands',  
         'Chile',  
         'China',  
         'Colombia',  
         'Costa Rica',  
         'Cyprus',  
         'Czech Republic',  
         'Denmark',  
         'Egypt',  
         'Estonia',  
         'Finland',  
         'France',  
         'Germany',  
         'Gibraltar',  
         'Greece',  
         'Guernsey',  
         'Hong Kong',  
         'Hungary',  
         'Iceland',  
         'India',  
         'Indonesia',  
         'Ireland',  
         'Isle of Man',  
         'Israel',  
         'Italy',  
         'Japan',  
         'Jersey',  
         'Jordan',  
         'Kazakhstan',  
         'Kuwait',
```

```
'Lithuania',  
'Luxembourg',  
'Macau',  
'Malaysia',  
'Malta',  
'Mexico',  
'Monaco',  
'Netherlands',  
'New Zealand',  
'Nigeria',  
'Norway',  
'Oman',  
'Pakistan',  
'Panama',  
'Peru',  
'Philippines',  
'Poland',  
'Portugal',  
'Qatar',  
'Romania',  
'Russia',  
'Saudi Arabia',  
'Singapore',  
'South Africa',  
'South Korea',  
'Spain',  
'Sudan',  
'Sweden',  
'Switzerland',  
'Taiwan',  
'Thailand',  
'Turkey',  
'United Arab Emirates',  
'United Kingdom',  
'United States',  
'Uruguay',  
'Vietnam']
```

Fix country

Setup LLM

```
In [7]: model_name = 'deepseek-coder-v2'
        config = {
            'model': model_name, # 'mistral' # "starcoder2"
        }

        clean_and_train = True # False

        sql_id = 1

        allow_llm_to_see_data = True
        # allow_llm_to_see_data (bool): Whether to allow the LLM to see the data (for the purposes of introspecting)
```

```
In [8]: vn = MyVanna(config=config)
```

```
In [9]: hostname = os.uname().nodename
        print("Hostname:", hostname)
```

Hostname: papa-game

```
In [10]: # file_db = os.path.abspath(os.path.expanduser(file_db))
        vn.connect_to_sqlite(file_db)
```

```
In [11]: vn.run_sql_is_set
```

Out[11]: True

```
In [12]: if clean_and_train:
        vn.remove_collections()
```

Prepare Training Data

Add DDL SQL statements

You only need to train once. Do not train again unless you want to add more training data.

```
In [13]: df_ddl = vn.run_sql("SELECT type, sql FROM sqlite_master WHERE sql is not null")
```

```
In [14]: df_ddl
```

```
Out[14]:
```

	type	sql
0	table	CREATE TABLE "t_market_cap" (\n"rank" INTEGER,...
1	table	CREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n...
2	table	CREATE TABLE "t_dividend_yield" (\n"rank" INTE...
3	table	CREATE TABLE "t_earnings" (\n"rank" INTEGER,\n...
4	table	CREATE TABLE "t_country_region" (\n"country" T...
5	table	CREATE TABLE "t_revenue" (\n"rank" INTEGER,\n ...

```
tables = "t_revenue t_earnings t_market_cap t_p_e_ratio t_dividend_yield"
sql_stmts = []
for t in tables.split():
    sql_stmts.append(f"select country from {t}")
print("\n UNION\n".join(sql_stmts))
```

Add business terms

```
In [15]: business_docs = [
    """
    Introduction:
    This dataset ranks top companies in the world.
    Its analysis delves into the financial performance of top companies by examining key metrics such as
    - revenue,
    - earnings,
    - market capitalisation,
    - P/E ratio,
    - dividend yield.

    By comparing these metrics, we gain a comprehensive understanding of a company's scale,
    profitability, market value, and growth potential.
    Through visualisations, the analysis also explores correlations between these metrics and offers
    insights into country-level performance, highlighting economic dominance across various sectors.
    This holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence
    and regional economic trends.
    """,
    """
    """
```

```
Terminologies:
TTM : Trailing Twelve Months
PE : Price over Earning Raio
LOV : List-of-Values
""" ,

"""
Key Metrics 1. Revenue (TTM):
Table Name: t_revenue ;
Definition: This is the total income generated by a company from its operations in the last twelve months
Potential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues
""" ,

"""
Key Metrics 2. Earnings (TTM):
Table Name: t_earnings
Definition: This refers to the company's profit after taxes and expenses over the trailing twelve months.
Potential Insights: Companies with high earnings are more efficient at converting revenue into profit, sug
""" ,

"""
Key Metrics 3. Market Capitalisation (Market Cap):
Table Name: t_market_cap
Definition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock p
Potential Insights: High market cap usually indicates investor confidence in the company. Comparing market
""" ,

"""
Key Metrics 4. P/E Ratio (TTM):
Table Name: t_p_e_ratio
Definition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-sha
Potential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a
""" ,

"""
Key Metrics 5. Dividend Yield (TTM):
Table Name: t_dividend_yield
Definition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each y
Potential Insights: High dividend yield may indicate that a company returns more income to shareholders. I
""" ,

"""
```



```
List-of-Value (LOV) mapping: Country to Region
Table Name: t_country_region
Definition: This table translate country to region, can be used to join on country column with other table:
"""
]
```

```
In [16]: if clean_and_train:
        for ddl in df_ddl['sql'].to_list():
            # ddl = strip_brackets(ddl)
            vn.train(ddl=ddl)

        # Sometimes you may want to add documentation about your business terminology or definitions.
        # vn.train(documentation="In the chinook database invoice means order")
        for bus_doc in business_docs:
            vn.train(documentation=bus_doc)
```

```
Adding ddl: CREATE TABLE "t_market_cap" (  
  "rank" INTEGER,  
  "name" TEXT,  
  "symbol" TEXT,  
  "marketcap" REAL,  
  "price_gbp" REAL,  
  "country" TEXT  
)  
Adding ddl: CREATE TABLE "t_p_e_ratio" (  
  "rank" INTEGER,  
  "name" TEXT,  
  "symbol" TEXT,  
  "pe_ratio_ttm" REAL,  
  "price_gbp" REAL,  
  "country" TEXT  
)  
Adding ddl: CREATE TABLE "t_dividend_yield" (  
  "rank" INTEGER,  
  "name" TEXT,  
  "symbol" TEXT,  
  "dividend_yield_ttm" REAL,  
  "price_gbp" REAL,  
  "country" TEXT  
)  
Adding ddl: CREATE TABLE "t_earnings" (  
  "rank" INTEGER,  
  "name" TEXT,  
  "symbol" TEXT,  
  "earnings_ttm" REAL,  
  "price_gbp" REAL,  
  "country" TEXT  
)  
Adding ddl: CREATE TABLE "t_country_region" (  
  "country" TEXT,  
  "region" TEXT,  
  "sub_region" TEXT,  
  "country_code_2" TEXT,  
  "country_code_3" TEXT,  
  "note" TEXT  
)  
Adding ddl: CREATE TABLE "t_revenue" (  
  "rank" INTEGER,
```

```
"name" TEXT,  
"symbol" TEXT,  
"revenue_ttm" INTEGER,  
"price_gbp" REAL,  
"country" TEXT  
)  
Adding documentation....  
Adding documentation....  
Adding documentation....  
Adding documentation....  
Adding documentation....  
Adding documentation....  
Adding documentation....  
Adding documentation....
```

```
In [17]: # show training data  
training_data = vn.get_training_data()  
training_data
```

Out[17]:

	id	question	content	training_data_type
0	051f4399-1594-56de-b0bd-9f74053fd5ff-ddl	None	CREATE TABLE "t_country_region" (\n"country" T...	ddl
1	75de6b21-b3df-53ea-a36f-9af69e40913b-ddl	None	CREATE TABLE "t_revenue" (\n"rank" INTEGER,\n ...	ddl
2	87669f00-5543-579a-a95c-fec096be48ed-ddl	None	CREATE TABLE "t_dividend_yield" (\n"rank" INTE...	ddl
3	b94bb579-73d6-521b-86de-5d5e599bbde5-ddl	None	CREATE TABLE "t_market_cap" (\n"rank" INTEGER,...	ddl
4	e0a92066-0804-52fd-be4e-437ac10622de-ddl	None	CREATE TABLE "t_earnings" (\n"rank" INTEGER,\n...	ddl
5	f68c7d4a-806f-55f0-962d-74de7018e372-ddl	None	CREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n...	ddl
0	160dc6f8-f66d-56f9-bf0d-f924c831f5fd-doc	None	\nTerminologies:\nTTM : Trailing Twelve Months...	documentation
1	29b133c0-6d77-5089-b7f4-d74f133c70d3-doc	None	\nKey Metrics 4. P/E Ratio (TTM):\nTable Name:...	documentation
2	5d1a1060-01ff-5a14-8fb8-6a79f1cbff38-doc	None	\nKey Metrics 2. Earnings (TTM):\nTable Name: ...	documentation
3	5ec048b8-d9ec-56c9-8ea3-bc955617643e-doc	None	\nKey Metrics 3. Market Capitalisation (Market...	documentation
4	d29df893-36db-5891-a6e7-eea218938b1a-doc	None	\nList-of-Value (LOV) mapping: Country to Regi...	documentation
5	d392adc0-ae2b-556a-a9c5-ae679ccb2ef0-doc	None	\nKey Metrics 5. Dividend Yield (TTM):\nTable ...	documentation
6	e5c03032-b9a5-5a1a-97b2-86ab75fa48e4-doc	None	\nKey Metrics 1. Revenue (TTM):\nTable Name: t...	documentation
7	f4c3144a-aa8a-5a09-9e75-0927811de802-doc	None	\nIntroduction:\nThis dataset ranks top compan...	documentation

Asking the AI

Whenever you ask a new question, it will find the 10 most relevant pieces of training data and use it as part of the LLM prompt to generate the SQL.

In [18]: `ts_start = time()`

```
SELECT name FROM sqlite_master WHERE type = 'table';
```

In [19]: `questions = [
 "Can you list all tables in the SQLite database catalog?",`

```

"which table stores Company P/E Ratio, Hint: No need to generate SQL",
"which table stores Company Dividend Yield, Hint: No need to generate SQL",
"which table stores Company Market Cap, Hint: No need to generate SQL",
"which table stores Company Revenue, Hint: No need to generate SQL",
"which table stores Company Earnings",
"Find 10 companies with the lowest PE Ratio around 10 in Germany",
"Find top 10 companies in the United States with the heighest market cap",
"Find the customer with the most invoices ",
"""
Find top 5 companyies in Asia with the hightes PE Ratio above 40, list company name and PE ratio,
Hint: "Asia" is a region name, you need to join "t_p_e_ratio" table with "t_country_region" table
on "country" columns to answer this question .
""",
"""
Find top 5 companyies with the lowest PE Ratio in the range of 20-30, list their names and respective PE r
""",
]

```

```

In [20]: for n, question in enumerate(questions):
        # if n != 4: continue
        # if n > 5: continue

        resp = vn.ask_adaptive(question=question, tag_id=n+2)

```

Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
 Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8

```
=====
# QUESTION - 2: Can you list all tables in the SQLite database catalog?
=====
```

```
[ ( SQL PROMPT ) ]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\n\n===Additional Context \n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company\'s profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company\'s outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company\'s size in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company\'s scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It\'s particularly u
```

seful for income-focused investors.\n\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Raio\nLOV : List-of-Values\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate_sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors. \n'}, {'role': 'user', 'content': 'Can you list all tables in the SQLite database catalog?'}]

Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

```
[( LLM RESPONSE )]
```sql
SELECT name FROM sqlite_master WHERE type='table';
```
```

Extracted SQL:

```
SELECT name FROM sqlite_master WHERE type='table'
```

```
[( <SQL> )]
```

generated SQL statement

```
SELECT name FROM sqlite_master WHERE type='table'
```

```
[( <DataFrame> )]
```

queried dataframe

| | name |
|---|------------------|
| 0 | t_market_cap |
| 1 | t_p_e_ratio |
| 2 | t_dividend_yield |
| 3 | t_earnings |
| 4 | t_country_region |
| 5 | t_revenue |

Ollama parameters:

model=deepseek-coder-v2:latest,

options={},

keep_alive=None

[(<Python>)]

generated Plotly code

import plotly.graph_objects **as** go

import pandas **as** pd

Assuming df is your DataFrame and it has been created using the query provided

if len(df) == 1:

```
fig = go.Figure(go.Indicator(
    mode="number",
    value=1,
    title={"text": "Number of Tables"}
))
```

else:

```
fig = go.Figure(data=[go.Table(header=dict(values=list(df.columns)),
    cells=dict(values=[df['name']]))])
```


| name |
|------------------|
| t_market_cap |
| t_p_e_ratio |
| t_dividend_yield |
| t_earnings |
| t_country_region |
| t_revenue |

Number of requested results 10 is greater than number of elements in index 1, updating n_results = 1
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8

```
=====
# QUESTION - 3:  which table stores Company P/E Ratio, Hint: No need to generate SQL
=====
```

```
[ ( SQL PROMPT ) ]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the
question. Your response should ONLY be based on the given context and follow the response guidelines and fo
rmat instructions. \n===Tables \nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol"
TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"ra
nk" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TE
XT\n)\n\nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INT
EGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name"
TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_d
ividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price
_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n
"sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional
Context \n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E)
ratio measures a company\'s current share price relative to its per-share earnings.\nPotential Insights: A
high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could im
ply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current
valuation.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into t
he financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- m
arket capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehe
nsive understanding of a company\'s scale, \nprofitability, market value, and growth potential. \nThrough v
isualisations, the analysis also explores correlations between these metrics and offers \ninsights into cou
ntry-level performance, highlighting economic dominance across various sectors. \nThis holistic approach pr
ovides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional econom
ic trends.\n\n\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total inc
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LOV : List-of-Values\n\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition:
Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative
to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more incom
e to shareholders. It\'s particularly useful for income-focused investors.\n\n\n\n\nKey Metrics 3. Market Capi
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```

\s outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company's size in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to roll up metrics at region-level\n\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate_sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors. \n'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite_master WHERE type='table'"}, {'role': 'user', 'content': 'which table stores Company P/E Ratio, Hint: No need to generate SQL'}]

Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

```
Number of requested results 10 is greater than number of elements in index 1, updating n_results = 1
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8
```

```
[( LLM RESPONSE )]
t_p_e_ratio
```

```
[( RETRY )]
***** 1 *****
```

```
[( SQL PROMPT )]
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \n\nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Ratio\nLOV : List-of-Values\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company's equity as of a given time.
```

ny\'s outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company's size in the stock market.

Potential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.

List-of-Value (LOV) mapping: Country to Region

Table Name: t_country_region

Definition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level

Response Guidelines

1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question.
2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate_sql
3. If the provided context is insufficient, please explain why it can't be generated.
4. Please use the most relevant table(s).
5. If the question has been asked and answered before, please repeat the answer exactly as it was given before.
6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors.

{ 'role': 'assistant', 'content': "SELECT name FROM sqlite_master WHERE type='table'", 'role': 'user', 'content': "\n\nFor this question: which table stores Company P/E Ratio, Hint: No need to generate SQL, \n\nyour generated SQL statement: t_p_e_ratio\n\nresults in the following exception: [ERROR-SQL] the generated SQL : t_p_e_ratio\n\ndoes not starts with ('select','with') .\n\nCan you please fix the error and re-generate the SQL statement?\n\n"}]

Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

[(LLM RESPONSE)]

Sure, I understand your confusion. The previous response did not start with 'select' or 'with', which is necessary for a valid SQL query. Let me correct that and provide you with an appropriate SQL statement to retrieve data from the table named "t_p_e_ratio".

Here is the corrected SQL query:

```
```sql
SELECT * FROM t_p_e_ratio;
```
```

Extracted SQL:

```
SELECT * FROM t_p_e_ratio
```

[(<SQL>)]

generated SQL statement

SELECT * FROM t_p_e_ratio

[(<DataFrame>)]
queried dataframe

| | rank | name | symbol | pe_ratio_ttm | price_gbp | country |
|-------------|------|----------------------|--------|--------------|-----------|---------------|
| 0 | 1 | Imperial Petroleum | IMPP | 0.109943 | 3.108797 | Greece |
| 1 | 2 | Vertex Energy | VTNR | 0.188889 | 0.092197 | United States |
| 2 | 3 | Spin Master | TOY.TO | 0.224758 | 17.414443 | Canada |
| 3 | 4 | Performance Shipping | PSHG | 0.225293 | 1.467916 | Greece |
| 4 | 5 | TherapeuticsMD | TXMD | 0.340956 | 1.280093 | United States |
| ... | ... | ... | ... | ... | ... | ... |
| 9907 | 9908 | MBX Biosciences | MBX | 0.000000 | 18.500389 | United States |
| 9908 | 9909 | Bicara Therapeutics | BCAX | -70.666700 | 18.896608 | United States |
| 9909 | 9910 | Zensho Holdings | 7550.T | 275.203000 | 42.447877 | Japan |
| 9910 | 9911 | BKV Corporation | BKV | -12.410500 | 13.867596 | United States |
| 9911 | 9912 | BioAge Labs | BIOA | 0.000000 | 16.679304 | United States |

9912 rows × 6 columns

Ollama parameters:
model=deepseek-coder-v2:latest,
options={},
keep_alive=None

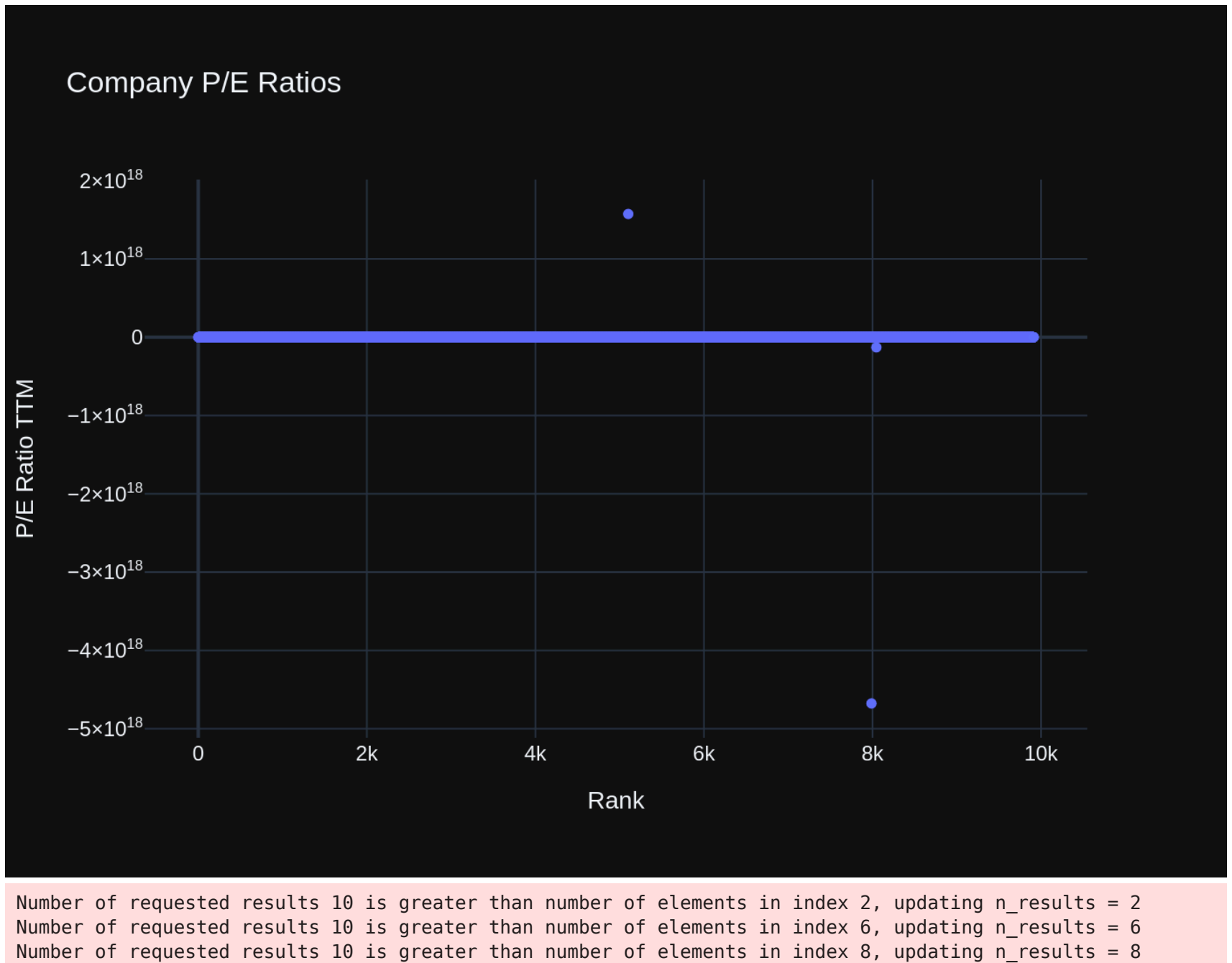
[(<Python>)]
generated Plotly code

```

import plotly.graph_objects as go
import pandas as pd

# Assuming df is your DataFrame
if len(df) == 1:
    fig = go.Figure(go.Indicator(
        mode="number",
        value=df['pe_ratio_ttm'].values[0],
        title={"text": "Company P/E Ratio"},
        domain={'x': [0, 1], 'y': [0, 1]}
    ))
else:
    fig = go.Figure(data=[go.Scatter(x=df['rank'], y=df['pe_ratio_ttm'], mode='markers', text=df['name'] + '<br>Symbol: ' + df['symbol'] + '<br>Country: ' + df['country'])])
    fig.update_layout(title="Company P/E Ratios", xaxis_title="Rank", yaxis_title="P/E Ratio TTM")

```




```
=====
# QUESTION - 4:  which table stores Company Dividend Yield, Hint: No need to generate SQL
=====
```

```
[ ( SQL PROMPT ) ]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the
question. Your response should ONLY be based on the given context and follow the response guidelines and fo
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bol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnin
gs" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n
"country" TEXT\n)\n\nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "reve
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R,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nC
REATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "pr
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T,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Addi
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mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to regio
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Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

```
Number of requested results 10 is greater than number of elements in index 2, updating n_results = 2
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8
```

[(LLM RESPONSE)]

The table that stores information about a company's dividend yield is `t_dividend_yield`.

[(RETRY)]

***** 1 *****

[(SQL PROMPT)]

[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translates country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\nTe

```
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```

Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

[(LLM RESPONSE)]

intermediate sql

```
```sql
```

```
SELECT DISTINCT column name FROM information schema.columns WHERE table name = 't dividend yield';
```

///

Extracted SQL:

```
SELECT DISTINCT column name FROM information schema.columns WHERE table name = 't dividend yield'
```

[ ( INTERMEDIATE SQL ) ]

```
SELECT DISTINCT column name FROM information schema.columns WHERE table name = 't dividend yield'
```

Number of requested results 10 is greater than number of elements in index 2, updating n results = 2

Number of requested results 10 is greater than number of elements in index 6, updating n results = 6

Number of requested results 10 is greater than number of elements in index 8, updating n results = 8

```
[(RETRY)]
```

```
***** 2 *****
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Raio\nLOV : List-of-Values\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock price multiplied by the number of share
```

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Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

[( LLM RESPONSE )]

To address your question, I will first generate an intermediate SQL query to find the distinct strings in the column that contains company dividend yield. Then, based on this information, I will construct a valid SQL query to answer your question. Here are the steps:

1. Generate an intermediate SQL query to find the distinct strings in the `column\_name` from the `information\_schema.columns` table where `table\_name` is `t\_dividend\_yield`.
2. Use the results of this intermediate query to construct a valid SQL query that directly addresses your question.

```
Intermediate SQL Query
```sql
-- intermediate_sql
SELECT DISTINCT column_name
```

```
FROM information_schema.columns
WHERE table_name = 't_dividend_yield';
```
```

### ### Valid SQL Query Based on Intermediate Results

Assuming the intermediate query identifies that the `column\_name` for company dividend yield is indeed "dividend\_yield\_ttm", we can construct a valid SQL query as follows:

```
```sql
-- final_sql
SELECT name
FROM t_dividend_yield;
```
```

This final SQL query will select the names of companies from the table `t\_dividend\_yield`, which stores information about a company's dividend yield.

Extracted SQL:

```
-- intermediate_sql
SELECT DISTINCT column_name
FROM information_schema.columns
WHERE table_name = 't_dividend_yield'
```

```
[(INTERMEDIATE SQL)]
-- intermediate_sql
SELECT DISTINCT column_name
FROM information_schema.columns
WHERE table_name = 't_dividend_yield'
```

```
Number of requested results 10 is greater than number of elements in index 2, updating n_results = 2
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8
```

```
=====
QUESTION - 5: which table stores Company Market Cap, Hint: No need to generate SQL
=====
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the
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\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REA
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```



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Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

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Number of requested results 10 is greater than number of elements in index 2, updating n_results = 2
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8
```

[( LLM RESPONSE )]

The table that stores company market cap is `t\_market\_cap`.

[( RETRY )]

\*\*\*\*\* 1 \*\*\*\*\*

[( SQL PROMPT )]

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```

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t','with') .\n
Can you please fix the error and re-generate the SQL statement?\n
"}]}

```

Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

[ ( LLM RESPONSE ) ]

Sure, I apologize for the confusion. Here's the corrected SQL query to find which table stores Company Market Cap:

```
```sql
SELECT 't_market_cap' AS table_name;
```
```

Extracted SQL:

```
SELECT 't market cap' AS table name
```

[ ( &lt;SQL&gt; ) ]

generated SQL statement

```
SELECT 't market cap' AS table_name
```

```
[(<DataFrame>)]
```

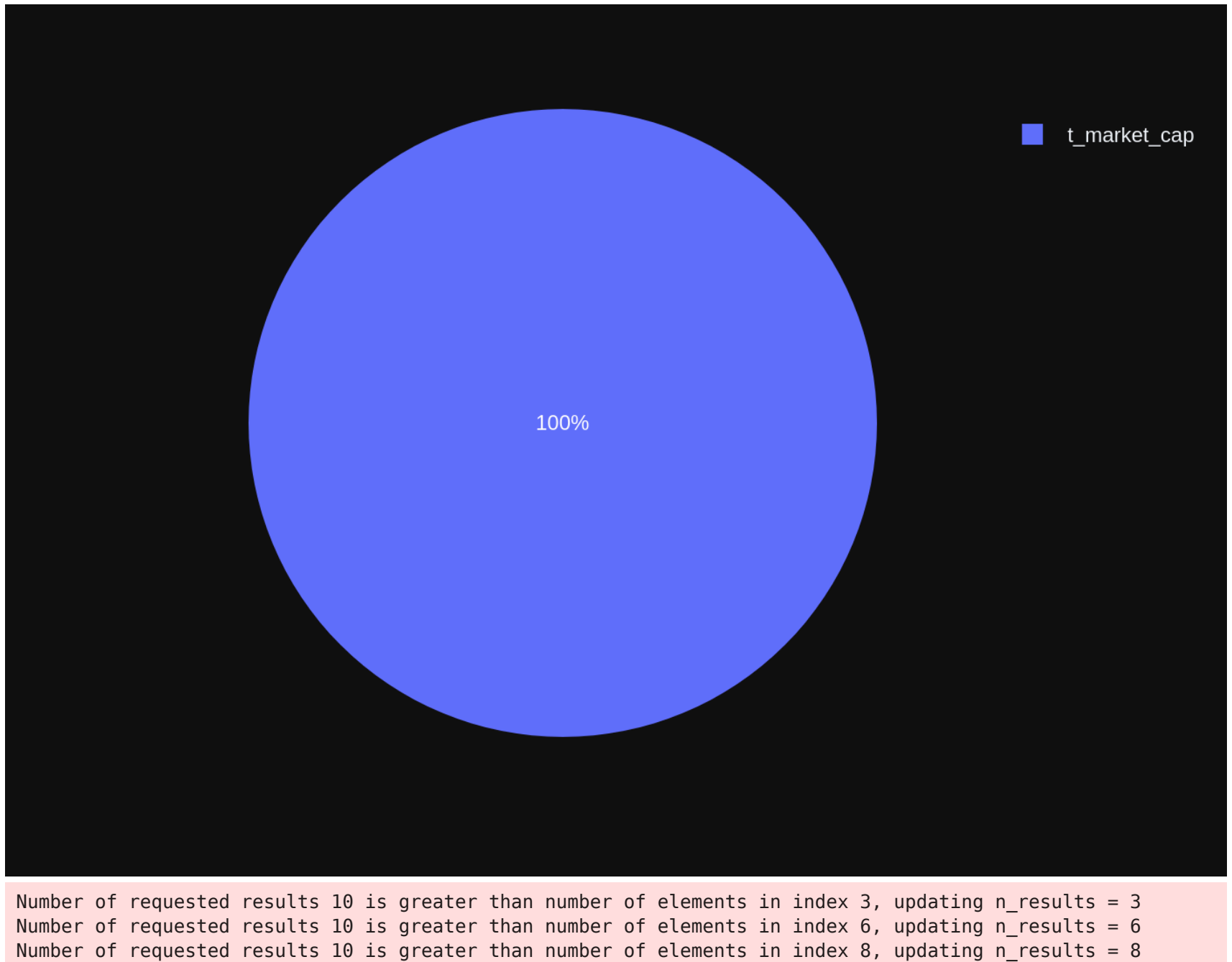
queried dataframe

```
 table_name
0 t_market_cap

Ollama parameters:
model=deepseek-coder-v2:latest,
options={},
keep_alive=None

[(<Python>)]
generated Plotly code
import plotly.graph_objects as go

fig = go.Figure(data=[go.Indicator(mode="number", value=df['table_name'].iloc[0])])
fig.update_layout(title={'text': "Company Market Cap Table"})
```



```
=====
QUESTION - 6: which table stores Company Revenue, Hint: No need to generate SQL
=====
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the
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Context \n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income
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```

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Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

```
Number of requested results 10 is greater than number of elements in index 3, updating n_results = 3
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8
```

```
[(LLM RESPONSE)]
```

```
t_revenue
```

```
[(RETRY)]
```

```
***** 1 *****
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue of ten indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Ratio\nLOV : List-of-Values\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rolup metrics at region-level\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company's size in the stock market.\nPo
```



tential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.

Key Metrics 5. Divide and Yield (TTM):

Table Name: `t_dividend_yield`

Definition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.

Potential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.

Response Guidelines

1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question.
2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying `intermediate_sql`
3. If the provided context is insufficient, please explain why it can't be generated.
4. Please use the most relevant table(s).
5. If the question has been asked and answered before, please repeat the answer exactly as it was given before.
6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors.

{  
 'role': 'assistant',  
 'content': "SELECT name FROM sqlite\_master WHERE type='table'",  
 'role': 'user',  
 'content': "\n\nFor this question: which table stores Company Revenue, Hint: No need to generate SQL, \n\nyour generated SQL statement: `t_revenue` results in the following exception: [ERROR-SQL] the generated SQL : `t_revenue` does not start with ('select', 'with') .\n\nCan you please fix the error and re-generate the SQL statement?\n\n"}]

Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

[ ( LLM RESPONSE ) ]

The context provided does not require generating a new SQL query. Instead, it suggests that there might be an issue with how the table name is being used in the query. Since the hint states "No need to generate SQL," we can directly address the issue by ensuring that the correct table name is used in any subsequent queries related to this context.

To resolve this, ensure that when referencing or querying the `"t_revenue"` table, you use its exact name without modification. If there are other parts of your query where it might be incorrectly referenced (which isn't directly evident from the given information), correct those references as well.

Number of requested results 10 is greater than number of elements in index 3, updating `n_results = 3`  
 Number of requested results 10 is greater than number of elements in index 6, updating `n_results = 6`  
 Number of requested results 10 is greater than number of elements in index 8, updating `n_results = 8`

```
[(RETRY)]
```

```
***** 2 *****
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue of ten indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Ratio\nLOV : List-of-Values\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company's size in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential
```

```

ial Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.
Response Guidelines
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2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate_sql
3. If the provided context is insufficient, please explain why it can't be generated.
4. Please use the most relevant table(s).
5. If the question has been asked and answered before, please repeat the answer exactly as it was given before.
6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors.
', {'role': 'assistant', 'content': "SELECT name FROM sqlite_master WHERE type='table'"}, {'role': 'user', 'content': '\n\nFor this question: \n\nFor this question: which table stores Company Revenue, Hint: No need to generate SQL, \n\nyour generated SQL statement: t_revenue results in the following exception: [ERROR-SQL] the generated SQL : t_revenue\n\n does not starts with (\'select\',\'with\') .\n\nCan you please fix the error and re-generate the SQL statement?\n\n\n, \n\nyour generated SQL statement: The context provided does not require generating a new SQL query. Instead, it suggests that there might be an issue with how the table name is being used in the query. Since the hint states "No need to generate SQL," we can directly address the issue by ensuring that the correct table name is used in any subsequent queries related to this context.\n\nTo resolve this, ensure that when referencing or querying the "t_revenue" table, you use its exact name without modification. If there are other parts of your query where it might be incorrectly referenced (which isn\'t directly evident from the given information), correct those references as well. results in the following exception: [ERROR-SQL] the generated SQL : The context provided does not require generating a new SQL query. Instead, it suggests that there might be an issue with how the table name is being used in the query. Since the hint states "No need to generate SQL," we can directly address the issue by ensuring that the correct table name is used in any subsequent queries related to this context.\n\nTo resolve this, ensure that when referencing or querying the "t_revenue" table, you use its exact name without modification. If there are other parts of your query where it might be incorrectly referenced (which isn\'t directly evident from the given information), correct those references as well.\n\n does not starts with (\'select\',\'with\') .\n\nCan you please fix the error and re-generate the SQL statement?\n\n\n'}]

```

```
Ollama parameters:
model=deepseek-coder-v2:latest,
options={},
keep alive=None
```

[ ( LLM RESPONSE ) ]

To ensure that we are correctly referencing the "t\_revenue" table in our queries, we need to use its exact name without any modifications. Here is how you can reference it in a valid SQL query:

```
```sql
SELECT * FROM t_revenue;
```

```

This query will select all columns from the "t\_revenue" table. If you have specific criteria or want to filter the results, you can add `WHERE` conditions to the query. For example:

```
```sql
SELECT name, revenue_ttm FROM t_revenue WHERE country = 'USA';
```
```

This will select only the company names and their trailing twelve-month revenues for companies located in the USA.

Extracted SQL:

```
SELECT * FROM t_revenue
```

[( <SQL> )]

generated SQL statement

**SELECT \* FROM** t\_revenue

[( <DataFrame> )]

queried dataframe

|             | rank | name          | symbol    | revenue_ttm  | price_gbp  | country        |
|-------------|------|---------------|-----------|--------------|------------|----------------|
| <b>0</b>    | 1    | Walmart       | WMT       | 665035000000 | 61.029186  | United States  |
| <b>1</b>    | 2    | Amazon        | AMZN      | 604334000000 | 143.454209 | United States  |
| <b>2</b>    | 3    | Saudi Aramco  | 2222.SR   | 495354806850 | 5.505405   | Saudi Arabia   |
| <b>3</b>    | 4    | Sinopec       | 600028.SS | 435696880608 | 0.748295   | China          |
| <b>4</b>    | 5    | PetroChina    | 601857.SS | 429671599508 | 0.969769   | China          |
| ...         | ...  | ...           | ...       | ...          | ...        | ...            |
| <b>9907</b> | 9908 | Kinnevik      | KINV-A.ST | -755524598   | 6.067929   | Sweden         |
| <b>9908</b> | 9909 | Sofina        | SOF.VI    | -1960650040  | 212.106043 | Belgium        |
| <b>9909</b> | 9910 | Quilter       | QLT.L     | -4921465842  | 1.331998   | United Kingdom |
| <b>9910</b> | 9911 | M&G plc       | MNG.L     | -10545825404 | 2.073004   | United Kingdom |
| <b>9911</b> | 9912 | Phoenix Group | PHNX.L    | -39227760552 | 5.630001   | United Kingdom |

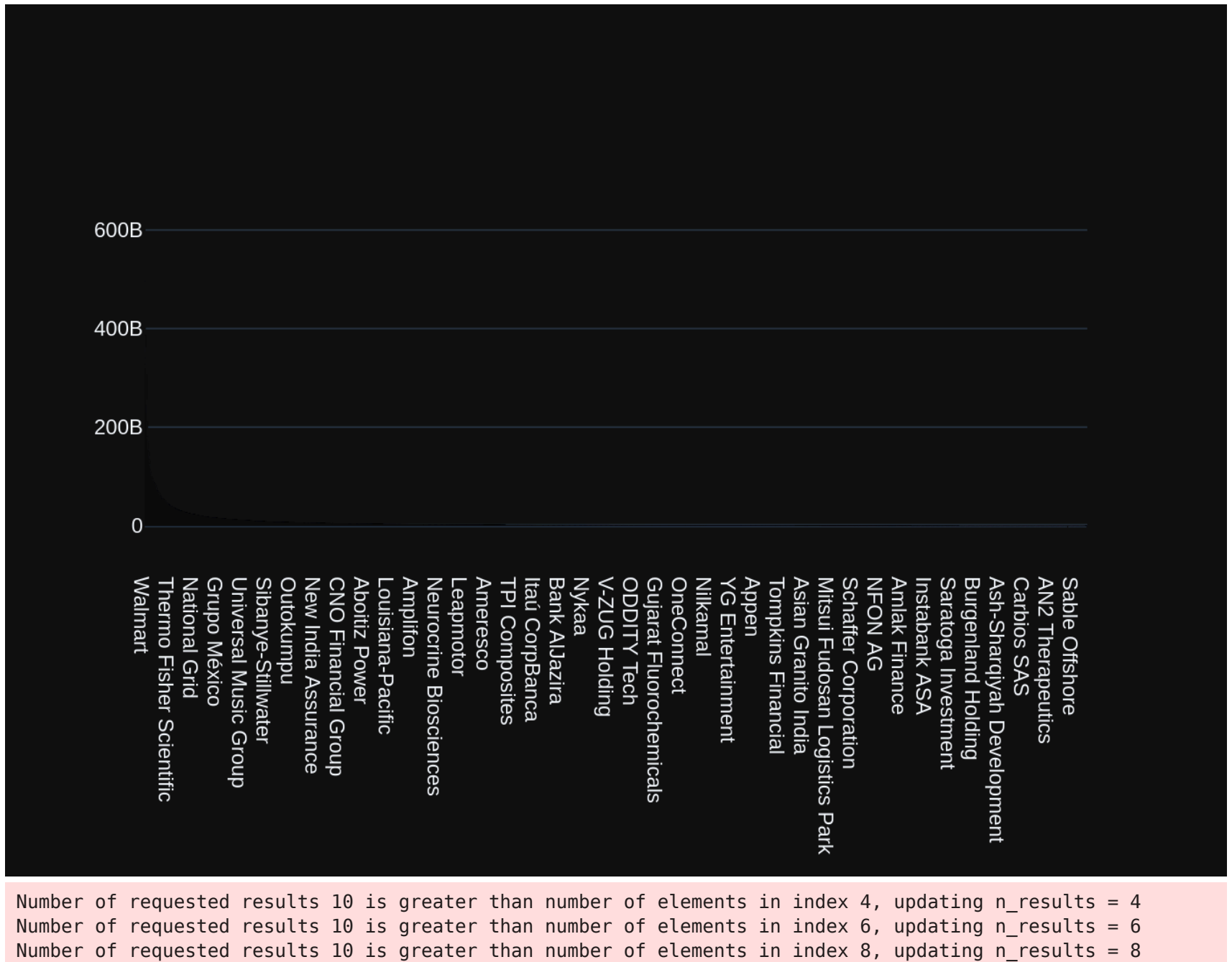
9912 rows × 6 columns

```
Ollama parameters:
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

```
[(<Python>)]
generated Plotly code
```

```
import plotly.graph_objects as go

if df.shape[0] == 1:
 fig = go.Figure(go.Indicator(
 mode="number",
 value=df['revenue_ttm'].iloc[0],
 title={"text": "Company Revenue (TTM)"})
))
else:
 fig = go.Figure(data=[go.Bar(x=df['name'], y=df['revenue_ttm'])])
```



```
=====
QUESTION - 7: which table stores Company Earnings
=====
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Raio\nLOV : List-of-Values\n\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company's
```



outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company's size in the stock market.

Potential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.

List-of-Value (LOV) mapping: Country to Region

Table Name: t\_country\_region

Definition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level

Response Guidelines

1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question.
2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate\_sql
3. If the provided context is insufficient, please explain why it can't be generated.
4. Please use the most relevant table(s).
5. If the question has been asked and answered before, please repeat the answer exactly as it was given before.
6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors.

{ 'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'", 'role': 'user', 'content': 'which table stores Company Earnings' }

Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

[ ( LLM RESPONSE ) ]

```
```sql
```

```
SELECT name FROM sqlite_master WHERE type='table' AND tbl_name='t_earnings';
```
```

Extracted SQL:

```
SELECT name FROM sqlite_master WHERE type='table' AND tbl_name='t_earnings'
```

[ ( <SQL> ) ]

generated SQL statement

```
SELECT name FROM sqlite_master WHERE type='table' AND tbl_name='t_earnings'
```

[ ( <DataFrame> ) ]

queried dataframe

|   | name       |
|---|------------|
| 0 | t_earnings |

```
Ollama parameters:
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

```
[(<Python>)]
generated Plotly code
```

```
import plotly.graph_objects as go
import pandas as pd
```

```
Assuming df is your DataFrame and it contains a single column 'name' with the table name
```

```
if len(df) == 1:
 fig = go.Figure(go.Indicator(
 mode="gauge+number",
 value=len(df),
 number={'suffix': " Company Earnings"},
 domain={'x': [0, 1], 'y': [0, 1]}
))
else:
 fig = go.Figure()
```



```
=====
QUESTION - 8: Find 10 companies with the lowest PE Ratio around 10 in Germany
=====
```

```
Number of requested results 10 is greater than number of elements in index 5, updating n_results = 5
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8
```

```
[(SQL PROMPT)]
```

[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t\_p\_e\_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe\_ratio\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue\_ttm" INTEGER,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_dividend\_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend\_yield\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_market\_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_country\_region" (\n"country" TEXT,\n "region" TEXT,\n "sub\_region" TEXT,\n "country\_code\_2" TEXT,\n "country\_code\_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Raio\nLOV : List-of-Values\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t\_p\_e\_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company\'s current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\n\nBy comparing these metrics, we gain a comprehensive understanding of a company\'s scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t\_dividend\_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It\'s particularly useful for income-focused investors.\n\n\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t\_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t\_earnings\nDefinition: This refers to the company\'s profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t\_country\_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t\_market\_cap\nDefinition: Market cap is the total value of a company\'s outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company\'s size in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\n\n===Response Guidelines \n1. If the provided context is sufficient, please genera

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Ollama parameters:

model=deepseek-coder-v2:latest,

options={},

keep\_alive=None

[( LLM RESPONSE )]

```sql

SELECT name

FROM t_p_e_ratio

WHERE country = 'Germany' AND pe_ratio_ttm BETWEEN 8 AND 12

ORDER BY pe_ratio_ttm ASC

LIMIT 10;

```

Extracted SQL:

SELECT name

FROM t\_p\_e\_ratio

WHERE country = 'Germany' AND pe\_ratio\_ttm BETWEEN 8 AND 12

ORDER BY pe\_ratio\_ttm ASC

LIMIT 10

[( <SQL> )]

generated SQL statement

**SELECT** name

**FROM** t\_p\_e\_ratio

**WHERE** country = 'Germany' **AND** pe\_ratio\_ttm **BETWEEN 8 AND 12**

**ORDER BY** pe\_ratio\_ttm **ASC**

**LIMIT 10**

[( <DataFrame> )]

queried dataframe

	name
0	Hornbach Baumarkt
1	Delignit AG
2	Elbstein AG
3	CompuGroup Medical
4	EnBW Energie
5	Nürnberger Versicherung
6	UmweltBank
7	Traton
8	LEWAG Holding
9	Sto SE & Co. KGaA

Ollama parameters:

model=deepseek-coder-v2:latest,

options={},

keep\_alive=None

[ ( <Python> ) ]

generated Plotly code

```
import plotly.graph_objects as go
```

```
import pandas as pd
```

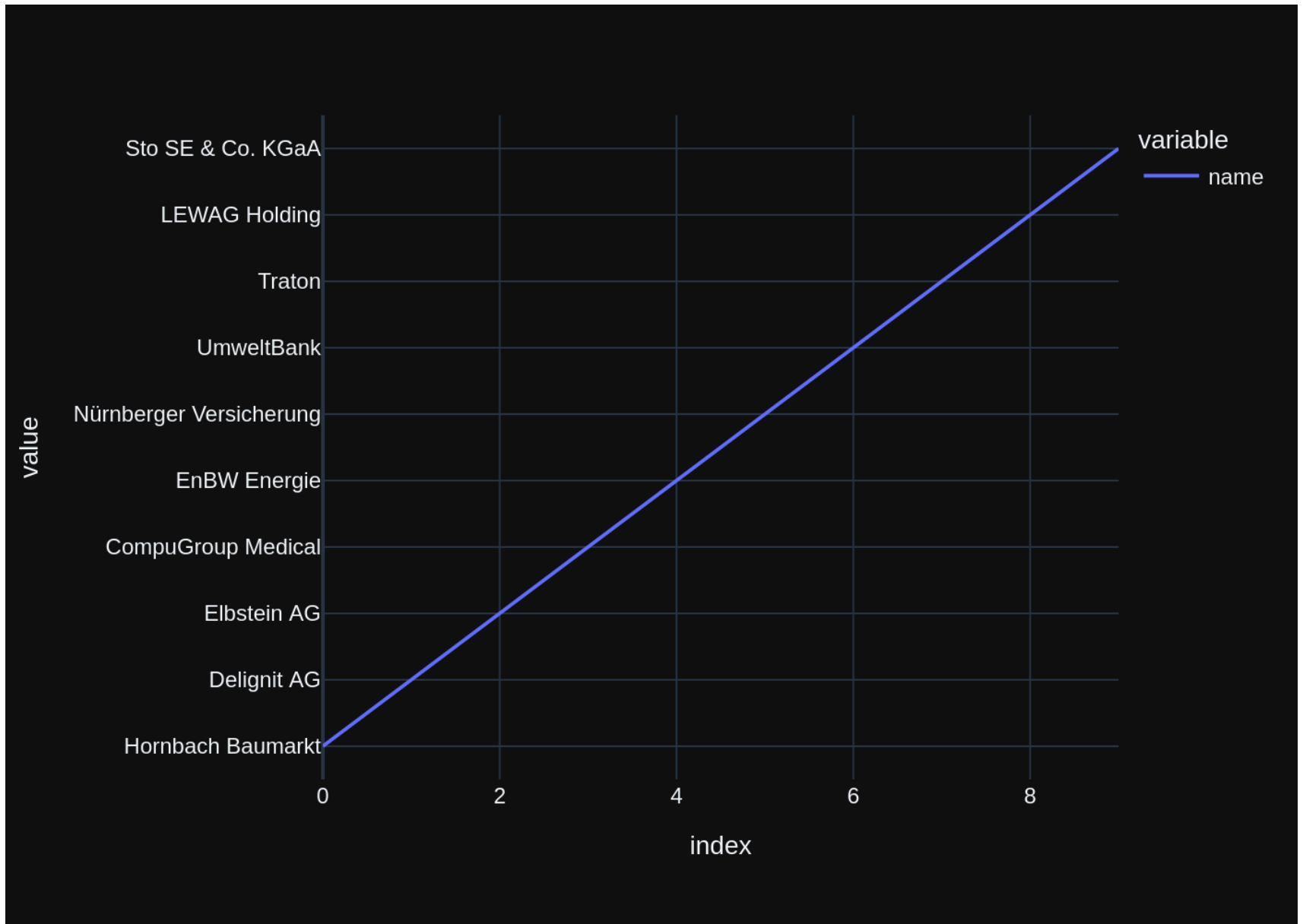
```
if df['name'].nunique() == 1:
```

```
 fig = go.Figure(data=[go.Indicator(
 mode="number", value=df['name'].iloc[0], title={"text": "Company"}
)])
```

```
else:
```

```
 fig = go.Figure(data=[go.Bar(x=df['name'], y=range(len(df)), orientation='h')])
```

```
fig.update_layout(title='Top 10 Companies with Lowest PE Ratio in Germany (8-12)', xaxis_title='Company Name', yaxis_title='Rank')
```



Number of requested results 10 is greater than number of elements in index 6, updating n\_results = 6

=====

# QUESTION - 9: Find top 10 companies in the United States with the heighest market cap

=====



Number of requested results 10 is greater than number of elements in index 6, updating n\_results = 6  
Number of requested results 10 is greater than number of elements in index 8, updating n\_results = 8

```
[(SQL PROMPT)]
```

[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t\_market\_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue\_ttm" INTEGER,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_p\_e\_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe\_ratio\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_dividend\_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend\_yield\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_country\_region" (\n"country" TEXT,\n "region" TEXT,\n "sub\_region" TEXT,\n "country\_code\_2" TEXT,\n "country\_code\_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t\_market\_cap\nDefinition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company's size in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t\_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Ratio\nLOV : List-of-Values\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t\_p\_e\_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t\_dividend\_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t\_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t\_country\_region\nDefinition: This table translates country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\n===Response Guidelines \n1. If the provided context is sufficient, please

se generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate\_sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors. \n'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'"}, {'role': 'user', 'content': 'Find top 10 companies in the United States with the highest market cap'}]

Ollama parameters:

model=deepseek-coder-v2:latest,

options={},

keep\_alive=None

[( LLM RESPONSE )]

```sql

SELECT name FROM t_market_cap WHERE country = 'United States' ORDER BY marketcap DESC LIMIT 10;

```

Extracted SQL:

SELECT name FROM t\_market\_cap WHERE country = 'United States' ORDER BY marketcap DESC LIMIT 10

[( <SQL> )]

generated SQL statement

**SELECT** name **FROM** t\_market\_cap **WHERE** country = 'United States' **ORDER BY** marketcap **DESC LIMIT 10**

[( <DataFrame> )]

queried dataframe

	name
0	Apple
1	Microsoft
2	NVIDIA
3	Alphabet (Google)
4	Amazon
5	Meta Platforms (Facebook)
6	Berkshire Hathaway
7	Tesla
8	Broadcom
9	Eli Lilly

```
Ollama parameters:
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

```
[(<Python>)]
generated Plotly code
```

```
import plotly.graph_objects as go
import pandas as pd
```

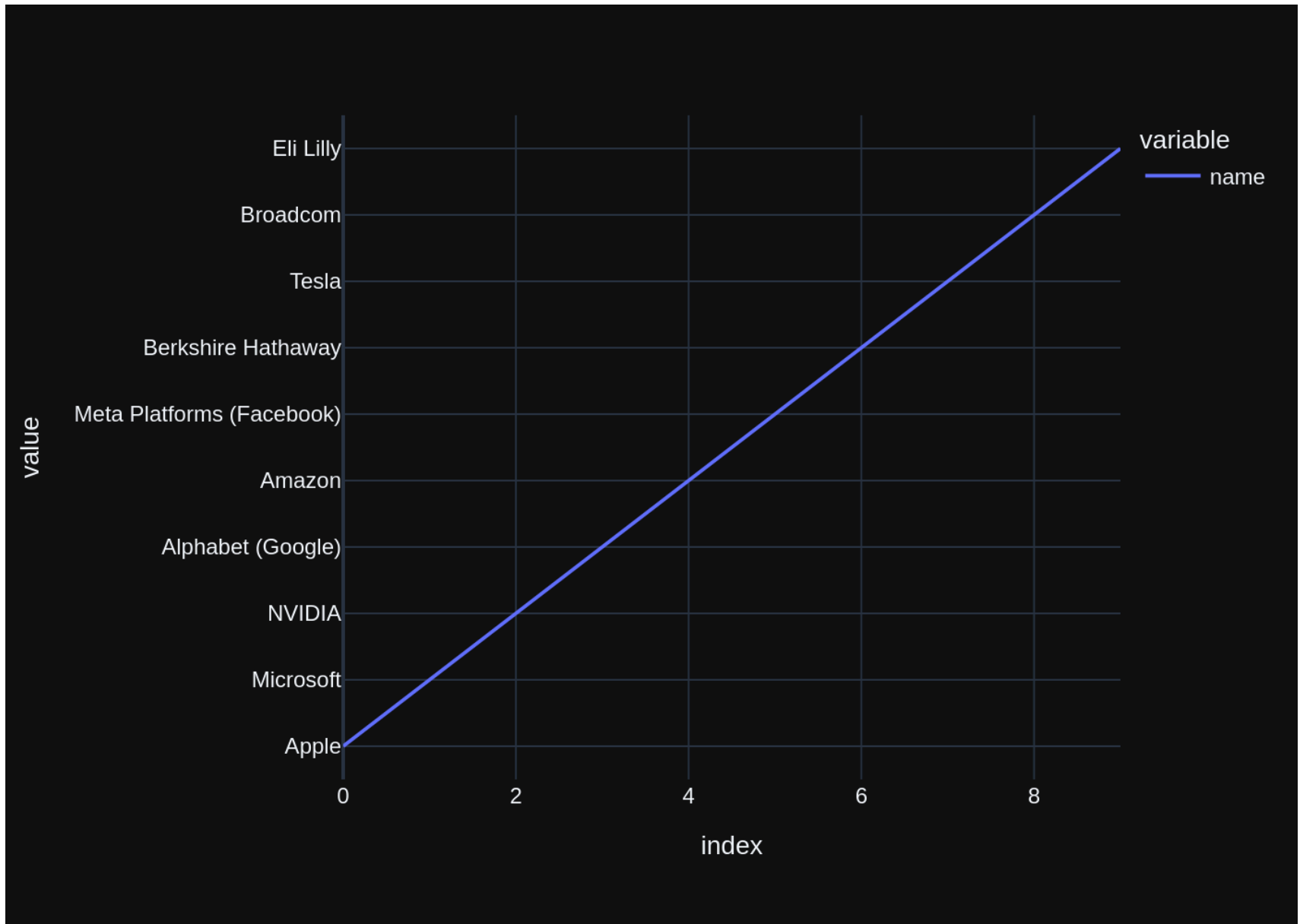
```
if len(df) == 1:
```

```
 fig = go.Figure(go.Indicator(mode="number", value=df['marketcap'].iloc[0], number={'prefix': "USD"}))
```

```
else:
```

```
 fig = px.bar(df, x='name', y='marketcap', labels={'marketcap': 'Market Cap'}, text_auto='.2s')
```

```
fig.update_layout(title='Top 10 Companies in the United States by Market Cap', xaxis_title='Company Name', yaxis_title='Market Cap (USD)')
```



Number of requested results 10 is greater than number of elements in index 7, updating n\_results = 7  
Number of requested results 10 is greater than number of elements in index 6, updating n\_results = 6  
Number of requested results 10 is greater than number of elements in index 8, updating n\_results = 8

```
=====
QUESTION - 10: Find the customer with the most invoices
=====
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue of ten indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Ratio\nLOV : List-of-Values\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns
```

more income to shareholders. It's particularly useful for income-focused investors.

Key Metrics 3. Market Capitalisation (Market Cap):

Table Name: `t_market_cap`

Definition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company's size in the stock market.

Potential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.

Response Guidelines

1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question.
2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying `intermediate_sql`
3. If the provided context is insufficient, please explain why it can't be generated.
4. Please use the most relevant table(s).
5. If the question has been asked and answered before, please repeat the answer exactly as it was given before.
6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors.

{ 'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'"}, { 'role': 'user', 'content': 'Find the customer with the most invoices '}]

Ollama parameters:

```
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

[( LLM RESPONSE )]

```
```sql
SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM Customer c
JOIN Invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1;
```
```

Extracted SQL:

```
SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM Customer c
JOIN Invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1
```

[( <SQL> )]

generated SQL statement

```
SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM Customer c
JOIN Invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1
```

```
Number of requested results 10 is greater than number of elements in index 7, updating n_results = 7
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8
```



```
[(RETRY)]
```

```
***** 1 *****
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Ratio\nLOV : List-of-Values\n\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock price multiplied by the number of shares outstanding.
```

res. It indicates the company's size in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate\_sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors. \n'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'"}, {'role': 'user', 'content': "\n\nFor this question: Find the customer with the most invoices , \n\nyour generated SQL statement: SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM Customer c\nJOIN Invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1 results in the following exception: [ERROR-DB] Failed to execute SQL: SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM Customer c\nJOIN Invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1\nExecution failed on sql 'SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM Customer c\nJOIN Invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1': no such table: Customer .\n\nCan you please fix the error and regenerate the SQL statement?\n\n"}]

Ollama parameters:  
model=deepseek-coder-v2:latest,  
options={},  
keep\_alive=None

[( LLM RESPONSE )]

The error message indicates that there is no table named "Customer" in your database. It seems like the table names might be case-sensitive or incorrectly referenced, as SQLite typically does not differentiate between uppercase and lowercase letters for table names unless explicitly defined otherwise with a schema definition or specific configuration settings.

To fix this issue, you need to ensure that the correct table name is used. The usual naming convention in SQLite is to use lowercase for table names (unless quoted). Therefore, if "Customer" is the table name, it should be referenced as such without any additional quotes or case sensitivity considerations unless specified otherwise.

Here's how you can adjust your SQL statement:

```
```sql
SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM customer c
JOIN invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1
```

```

es
FROM customer c -- Notice the lowercase "c" for the table name
JOIN invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1;
```

```

Please note that if your database schema or data has been imported with incorrect casing assumptions, you might need to adjust your database connection settings or manually rename tables in the database itself to match the case used in SQL statements. However, for SQLite databases managed through code (like Python's `sqlite3` module), adjusting the table name as shown should resolve the issue.

Extracted SQL:

```

SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM customer c -- Notice the lowercase "c" for the table name
JOIN invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1

```

[( <SQL> )]

generated SQL statement

```

SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM customer c -- Notice the lowercase "c" for the table name
JOIN invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1

```

Number of requested results 10 is greater than number of elements in index 7, updating n\_results = 7  
 Number of requested results 10 is greater than number of elements in index 6, updating n\_results = 6  
 Number of requested results 10 is greater than number of elements in index 8, updating n\_results = 8

```
[(RETRY)]
```

```
***** 2 *****
```

```
[(SQL PROMPT)]
```

```
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\n\n===Additional Context \n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Ratio\nLOV : List-of-Values\n\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock price multiplied by the number of shares outstanding.
```

res. It indicates the company's size in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\n===Response Guidelines \n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate\_sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors. \n'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'"}, {'role': 'user', 'content': '\n\nFor this question: \n\nFind the customer with the most invoices , \n\nyour generated SQL statement: SELECT c.CustomerId, c.FirstName || \' \' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM Customer c\nJOIN Invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1\nresults in the following exception: [ERROR-DB] Failed to execute SQL: SELECT c.CustomerId, c.FirstName || \' \' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM Customer c\nJOIN Invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1\nExecution failed on sql \'SELECT c.CustomerId, c.FirstName || \' \' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM Customer c\nJOIN Invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1\': no such table: Customer .\n\nCan you please fix the error and re-generate the SQL statement?\n\n, \n\nyour generated SQL statement: SELECT c.CustomerId, c.FirstName || \' \' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM customer c -- Notice the lowercase "c" for the table name\nJOIN invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1\nresults in the following exception: [ERROR-DB] Failed to execute SQL: SELECT c.CustomerId, c.FirstName || \' \' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM customer c -- Notice the lowercase "c" for the table name\nJOIN invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1\nExecution failed on sql \'SELECT c.CustomerId, c.FirstName || \' \' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices\nFROM customer c -- Notice the lowercase "c" for the table name\nJOIN invoice i ON c.CustomerId = i.CustomerId\nGROUP BY c.CustomerId\nORDER BY NumberOfInvoices DESC\nLIMIT 1\': no such table: customer .\n\nCan you please fix the error and re-generate the SQL statement?\n\n'}]

Ollama parameters:

model=deepseek-coder-v2:latest,

options={},

keep\_alive=None

[ERROR-SQL] Failed to generate SQL for prompt:

For this question:

For this question: Find the customer with the most invoices ,

your generated SQL statement: SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices

```

FROM Customer c
JOIN Invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1 results in the following exception: [ERROR-DB] Failed to execute SQL: SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM Customer c
JOIN Invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1
Execution failed on sql 'SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM Customer c
JOIN Invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1': no such table: Customer .

```

Can you please fix the error and re-generate the SQL statement?

```

,
your generated SQL statement: SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM customer c -- Notice the lowercase "c" for the table name
JOIN invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1 results in the following exception: [ERROR-DB] Failed to execute SQL: SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM customer c -- Notice the lowercase "c" for the table name
JOIN invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1
Execution failed on sql 'SELECT c.CustomerId, c.FirstName || ' ' || c.LastName AS CustomerName, COUNT(i.InvoiceId) AS NumberOfInvoices
FROM customer c -- Notice the lowercase "c" for the table name
JOIN invoice i ON c.CustomerId = i.CustomerId
GROUP BY c.CustomerId
ORDER BY NumberOfInvoices DESC
LIMIT 1': no such table: customer .

```

Can you please fix the error and re-generate the SQL statement?

with the following exception:  
an unknown error was encountered while running the model

```
Number of requested results 10 is greater than number of elements in index 7, updating n_results = 7
Number of requested results 10 is greater than number of elements in index 6, updating n_results = 6
Number of requested results 10 is greater than number of elements in index 8, updating n_results = 8
```

=====

# QUESTION - 11:

Find top 5 companies in Asia with the highest PE Ratio above 40, list company name and PE ratio, Hint: "Asia" is a region name, you need to join "t\_p\_e\_ratio" table with "t\_country\_region" table on "country" columns to answer this question .

=====

[( SQL PROMPT )]

[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t\_p\_e\_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe\_ratio\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_market\_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue\_ttm" INTEGER,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t\_country\_region" (\n"country" TEXT,\n "region" TEXT,\n "sub\_region" TEXT,\n "country\_code\_2" TEXT,\n "country\_code\_3" TEXT,\n "note" TEXT\n)\n\nCREATE TABLE "t\_dividend\_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend\_yield\_ttm" REAL,\n "price\_gbp" REAL,\n "country" TEXT\n)\n\n===Additional Context \n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\nBy comparing these metrics, we gain a comprehensive understanding of a company's scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t\_country\_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t\_p\_e\_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company's current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Ratio\nLOV : List-of-Values\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t\_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t\_market\_cap\nDefinition: Market cap is the total value of a company's outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company's size



e in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t\_earnings\nDefinition: This refers to the company's profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t\_dividend\_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It's particularly useful for income-focused investors.\n\n\n\n===Response Guidelines\n1. If the provided context is sufficient, please generate a valid SQL query without any explanations for the question.\n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate\_sql\n3. If the provided context is insufficient, please explain why it can't be generated.\n4. Please use the most relevant table(s).\n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before.\n6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors.\n'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'"}, {'role': 'user', 'content': '\nFind top 5 companies in Asia with the highest PE Ratio above 40, list company name and PE ratio,\nHint: "Asia" is a region name, you need to join "t\_p\_e\_ratio" table with "t\_country\_region" table \nnon "country" columns to answer this question.\n'}]

Ollama parameters:

model=deepseek-coder-v2:latest,

options={},

keep\_alive=None

[( LLM RESPONSE )]

```sql

SELECT t_p_e_ratio.name, t_p_e_ratio.pe_ratio_ttm

FROM t_p_e_ratio

JOIN t_country_region ON t_p_e_ratio.country = t_country_region.country

WHERE t_country_region.region = 'Asia' AND t_p_e_ratio.pe_ratio_ttm > 40

ORDER BY t_p_e_ratio.pe_ratio_ttm DESC

LIMIT 5;

```

Extracted SQL:

SELECT t\_p\_e\_ratio.name, t\_p\_e\_ratio.pe\_ratio\_ttm

FROM t\_p\_e\_ratio

JOIN t\_country\_region ON t\_p\_e\_ratio.country = t\_country\_region.country

WHERE t\_country\_region.region = 'Asia' AND t\_p\_e\_ratio.pe\_ratio\_ttm > 40

ORDER BY t\_p\_e\_ratio.pe\_ratio\_ttm DESC

LIMIT 5

[( <SQL> )]

generated SQL statement

**SELECT** t\_p\_e\_ratio.name, t\_p\_e\_ratio.pe\_ratio\_ttm

**FROM** t\_p\_e\_ratio

**JOIN** t\_country\_region **ON** t\_p\_e\_ratio.country = t\_country\_region.country

**WHERE** t\_country\_region.region = 'Asia' **AND** t\_p\_e\_ratio.pe\_ratio\_ttm > 40

**ORDER BY** t\_p\_e\_ratio.pe\_ratio\_ttm **DESC**

**LIMIT 5**

[( <DataFrame> )]

queried dataframe

	name	pe_ratio_ttm
0	Ceragon Networks	1.573740e+18
1	National Industries Group Holding	3.459630e+05
2	Gulf Investment House Company	2.369150e+05
3	Kuwait Cement Company	1.047660e+05
4	Kuwait Investment Company	6.837150e+04

Ollama parameters:

model=deepseek-coder-v2:latest,

options={},

keep\_alive=None

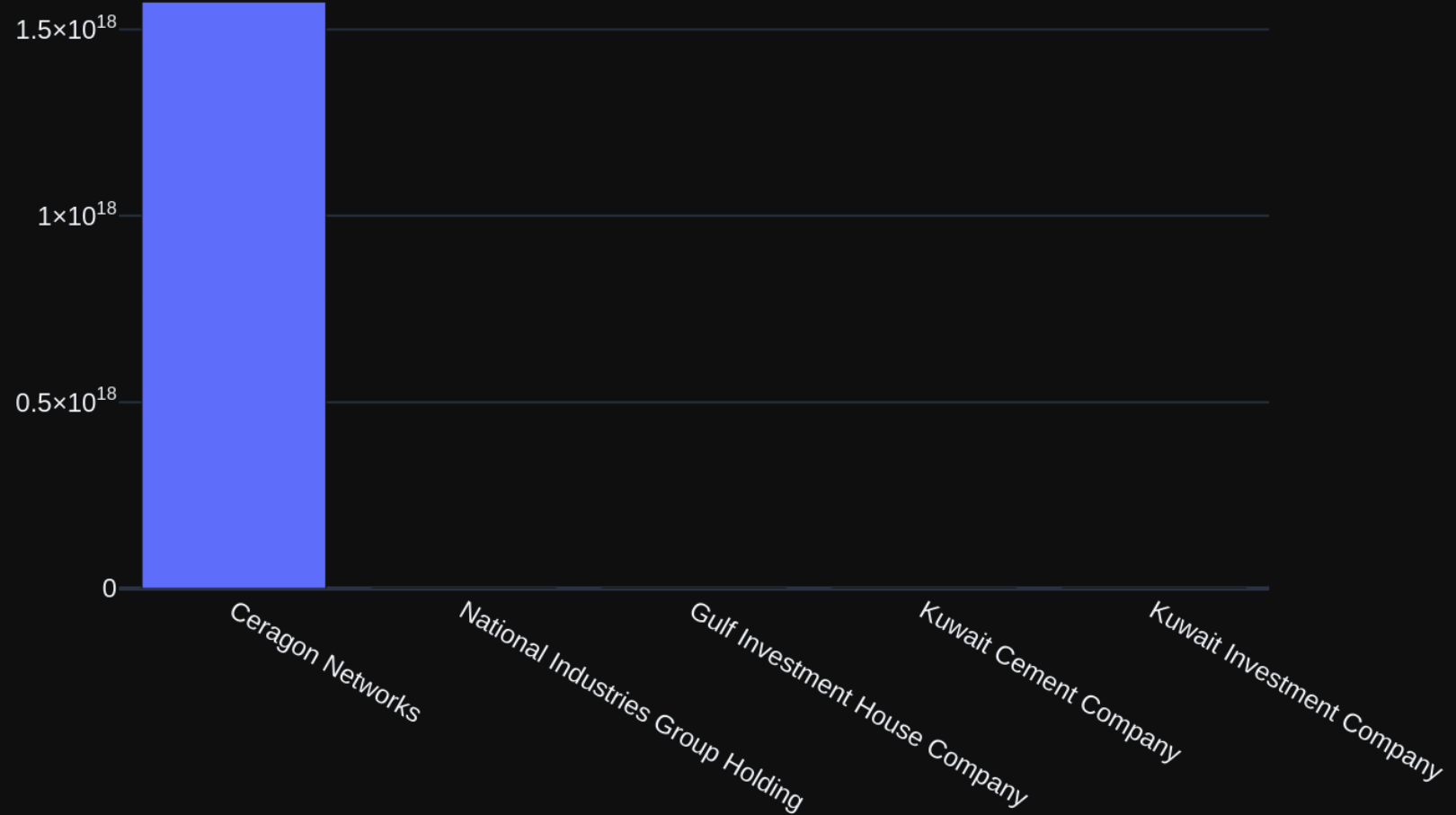
[( <Python> )]

generated Plotly code

```
import plotly.graph_objects as go

if len(df) == 1:
 fig = go.Figure(go.Indicator(
 mode="number",
 value=df['pe_ratio_ttm'].values[0],
 title={"text": "PE Ratio"},
 number={"prefix": ""}
))
else:
 fig = go.Figure()
 fig.add_trace(go.Bar(x=df['name'], y=df['pe_ratio_ttm'], name='PE Ratio'))
 fig.update_layout(title='Top 5 Companies in Asia with Highest PE Ratio above 40', barmode='group')
```

### Top 5 Companies in Asia with Highest PE Ratio above 40



Number of requested results 10 is greater than number of elements in index 8, updating n\_results = 8

=====

# QUESTION - 12:

Find top 5 companyies with the lowest PE Ratio in the range of 20-30, list their names and respective PE ratios,

=====

Number of requested results 10 is greater than number of elements in index 6, updating n\_results = 6

Number of requested results 10 is greater than number of elements in index 8, updating n\_results = 8

```

[(SQL PROMPT)]
[{'role': 'system', 'content': 'You are a SQLite expert. Please help to generate a SQL query to answer the question. Your response should ONLY be based on the given context and follow the response guidelines and format instructions. \n===Tables \nCREATE TABLE "t_p_e_ratio" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "pe_ratio_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_earnings" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "earnings_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_revenue" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "revenue_ttm" INTEGER,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_dividend_yield" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "dividend_yield_ttm" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_market_cap" (\n"rank" INTEGER,\n "name" TEXT,\n "symbol" TEXT,\n "marketcap" REAL,\n "price_gbp" REAL,\n "country" TEXT\n)\n\nCREATE TABLE "t_country_region" (\n"country" TEXT,\n "region" TEXT,\n "sub_region" TEXT,\n "country_code_2" TEXT,\n "country_code_3" TEXT,\n "note" TEXT\n)\n\n\n===Additional Context \n\n\nTerminologies:\nTTM : Trailing Twelve Months\nPE : Price over Earning Raio\nLOV : List-of-Values\n\n\n\nKey Metrics 4. P/E Ratio (TTM):\nTable Name: t_p_e_ratio\nDefinition: Price-to-Earnings (P/E) ratio measures a company\'s current share price relative to its per-share earnings.\nPotential Insights: A high P/E ratio may indicate that investors expect high growth in the future, while a low P/E ratio could imply undervaluation or scepticism about growth. Companies are compared by their growth prospects or current valuation.\n\n\n\nIntroduction:\nThis dataset ranks top companies in the world.\nIts analysis delves into the financial performance of top companies by examining key metrics such as \n- revenue, \n- earnings, \n- market capitalisation, \n- P/E ratio, \n- dividend yield. \n\n\nBy comparing these metrics, we gain a comprehensive understanding of a company\'s scale, \nprofitability, market value, and growth potential. \nThrough visualisations, the analysis also explores correlations between these metrics and offers \ninsights into country-level performance, highlighting economic dominance across various sectors. \nThis holistic approach provides a multi-dimensional view of global financial powerhouses, investor confidence, \nand regional economic trends.\n\n\n\nKey Metrics 5. Dividend Yield (TTM):\nTable Name: t_dividend_yield\nDefinition: Dividend yield is a financial ratio that shows how much a company pays out in dividends each year relative to its share price.\nPotential Insights: High dividend yield may indicate that a company returns more income to shareholders. It\'s particularly useful for income-focused investors.\n\n\n\n\nKey Metrics 1. Revenue (TTM):\nTable Name: t_revenue ;\nDefinition: This is the total income generated by a company from its operations in the last twelve months ;\nPotential Insights: High revenue often indicates market dominance or high sales volume. Comparing revenues can reveal which companies are the largest in terms of business volume.\n\n\n\n\nKey Metrics 2. Earnings (TTM):\nTable Name: t_earnings\nDefinition: This refers to the company\'s profit after taxes and expenses over the trailing twelve months.\nPotential Insights: Companies with high earnings are more efficient at converting revenue into profit, suggesting better profitability or cost management. A comparison of earnings provides insight into profitability rather than just scale.\n\n\n\n\nKey Metrics 3. Market Capitalisation (Market Cap):\nTable Name: t_market_cap\nDefinition: Market cap is the total value of a company\'s outstanding shares of stock, calculated as stock price multiplied by the number of shares. It indicates the company\'s size in the stock market.\nPotential Insights: High market cap usually indicates investor confidence in the company. Comparing market cap among the top 15 companies reveals their relative size in financial markets.\n\n\n\n\nList-of-Value (LOV) mapping: Country to Region\nTable Name: t_country_region\nDefinition: This table translate country to region, can be used to join on country column with other tables to rollup metrics at region-level\n\n\n\n===Response Guidelines \n1. If the provided context is sufficient, please gener

```

ate a valid SQL query without any explanations for the question. \n2. If the provided context is almost sufficient but requires knowledge of a specific string in a particular column, please generate an intermediate SQL query to find the distinct strings in that column. Prepend the query with a comment saying intermediate\_sql \n3. If the provided context is insufficient, please explain why it can't be generated. \n4. Please use the most relevant table(s). \n5. If the question has been asked and answered before, please repeat the answer exactly as it was given before. \n6. Ensure that the output SQL is SQLite-compliant and executable, and free of syntax errors. \n'}, {'role': 'assistant', 'content': "SELECT name FROM sqlite\_master WHERE type='table'"}, {'role': 'user', 'content': '\nFind top 5 companies with the lowest PE Ratio in the range of 20-30, list their names and respective PE ratios,\n'}]

Ollama parameters:

model=deepseek-coder-v2:latest,

options={},

keep\_alive=None

[( LLM RESPONSE )]

```sql

SELECT name, pe_ratio_ttm FROM t_p_e_ratio WHERE pe_ratio_ttm BETWEEN 20 AND 30 ORDER BY pe_ratio_ttm LIMIT 5;

```

Extracted SQL:

SELECT name, pe\_ratio\_ttm FROM t\_p\_e\_ratio WHERE pe\_ratio\_ttm BETWEEN 20 AND 30 ORDER BY pe\_ratio\_ttm LIMIT 5

[( <SQL> )]

generated SQL statement

**SELECT name, pe\_ratio\_ttm FROM t\_p\_e\_ratio WHERE pe\_ratio\_ttm BETWEEN 20 AND 30 ORDER BY pe\_ratio\_ttm LIMIT 5**

[( <DataFrame> )]

queried dataframe

	name	pe_ratio_ttm
0	Fresenius	20.0133
1	Equatorial Energia	20.0178
2	Viper Energy Partners	20.0268
3	Avanza Bank	20.0304
4	Select Energy Services	20.0370

```
Ollama parameters:
model=deepseek-coder-v2:latest,
options={},
keep_alive=None
```

```
[(<Python>)]
generated Plotly code
```

```
import plotly.graph_objects as go
import pandas as pd
```

```
Assuming df is your DataFrame
```

```
if len(df) == 1:
```

```
 fig = go.Figure(go.Indicator(
 mode="number",
 value=df['pe_ratio_ttm'].values[0],
 title={"text": f"PE Ratio for {df['name'].values[0]}"})
))
```

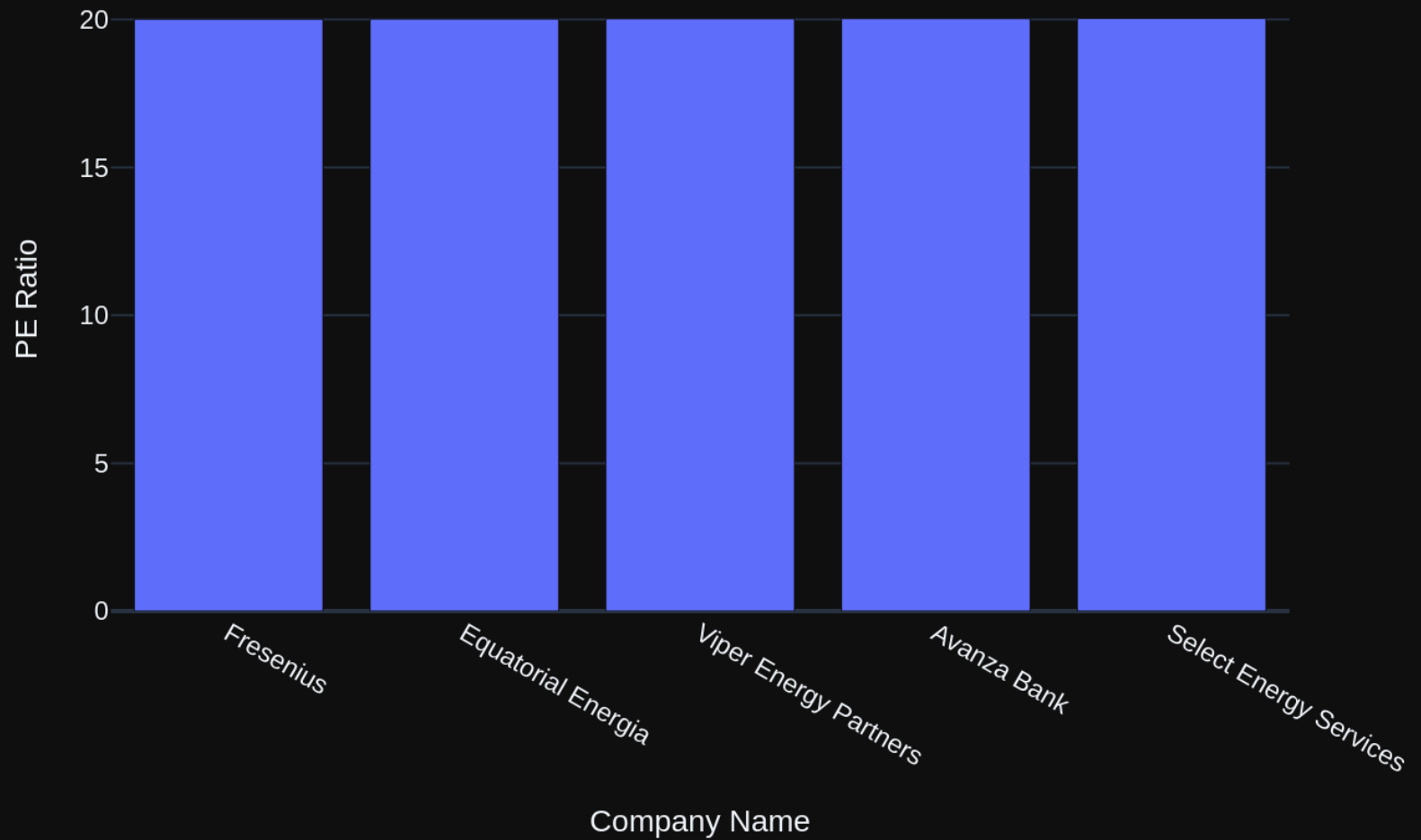
```
else:
```

```
 fig = go.Figure(data=[go.Bar(x=df['name'], y=df['pe_ratio_ttm'])])
```

```
fig.update_layout(title='Top 5 Companies with Lowest PE Ratio in Range 20-30',
 xaxis_title='Company Name',
 yaxis_title='PE Ratio')
```



### Top 5 Companies with Lowest PE Ratio in Range 20-30



In [ ]:

In [ ]:

## Check completion time

```
In [21]: ts_stop = time()
elapsed_time = ts_stop - ts_start
print(f"Completed tests:\n===== \n run on host '{hostname}' \n with LLM model '{model_name}' \n .
```

Completed tests:

=====

run on host 'papa-game'  
with LLM model 'deepseek-coder-v2'  
took 1789.61 sec

In [ ]: