STOCK ANALYSIS

ITI GRADUATION PROJECT

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Summary

Owning stocks in different companies can help you build your savings, protect your money from inflation and taxes, and maximize income from your investments. It's important to know that there are risks when investing in the stock market. That's the part where our project comes in handy. We will take you on a mini-tour in the stock market. We expect you to have a clear understanding of the stock market and be aware of the right time and make use of the right opportunity to invest your money in, when the time is risky to invest, and when it's not even worth it.

Our focus will be on the 500 S&P Index.

The S&P 500 Index, or Standard & Poor's 500 Index, is a market-capitalization-weighted index of 500 leading publicly traded companies in the U.S. It is not a list of the top 500 U.S. companies by market cap because there are other criteria that the index includes. Still, the S&P 500 index is regarded as one of the best gauges of prominent American equities' performance, and by extension, that of the stock market overall.

After you gain enough knowledge about the 500 S&P Index, we will talk about the hero of our story, Uber.

Uber Technologies, Inc. (Uber) is an American mobility service provider based in San Francisco with operations in approximately 72 countries and 10,500 cities. Its services include:

•Ride-hailing

•Food delivery (Uber Eats and Postmates)

•Package delivery

•Couriers

•Freight transportation

•Electric bicycle

•Motorized scooter rental via a partnership with Lime

•Ferry transport (partnership with local operators).

Uber does not own any vehicles; instead, it receives a commission from each booking. Fares are quoted to the customer in advance but vary using a dynamic pricing model based on the local supply and demand at the time of the booking.

Our team chose Uber as our story's main focus because not only does the company have its ups and downs, but it also got an exciting story to tell.

1- Price to earnings

The price-to-earnings ratio (P/E) is one of the most widely used metrics for investors and analysts to determine stock valuation. In addition to showing whether a company's stock price is overvalued or undervalued, the P/E can reveal how a stock's valuation compares to its industry group or a benchmark like the S&P 500 index.

The P/E ratio helps investors determine the market value of a stock as compared to the company's earnings. In short, the P/E shows what the market is willing to pay today for a stock based on its past or future earnings. A high P/E could mean that a stock's price is high relative to earnings and possibly overvalued. Conversely, a low P/E might indicate that the current stock price is low relative to earnings.

A higher P/E ratio shows that investors are willing to pay a higher share price today because of growth expectations in the future. The average P/E for the S&P 500 has historically ranged from 13 to 15. For example, a company with a current P/E of 25, above the S&P average, trades at 25 times earnings. The high multiple indicates that investors expect higher growth from the company compared to the overall market.

$$\frac{\mathrm{P}}{\mathrm{E}} = \frac{\text{Share Price}}{\text{EPS}}$$

where:

$$\frac{\mathrm{P}}{\mathrm{E}} = \text{Price-to-earnings ratio}$$

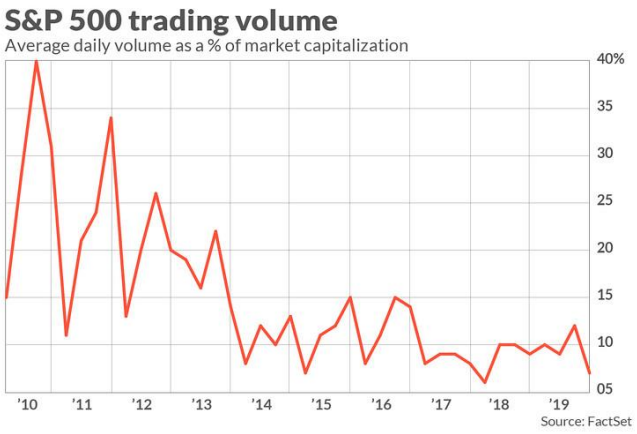
$$\text{Share Price} = \text{Market value per share}$$

$$\text{EPS} = \text{Earnings per share}$$

KPI-1: Consider if the values of stocks in each sector & know which sector have over or under values (Average) (Count).

2- Volume

- Volume measures the number of shares traded in a stock or contracts traded in futures or options.
- Volume can indicate market strength, as rising markets on increasing volume are typically viewed as strong and healthy.
- When prices fall on increasing volume, the trend is gathering strength to the downside.



KPI-2: The percentage of each country trading stocks per each day (To know which companies have the highest trading stocks in a certain year, to understand how investors think about companies).

3-Earning per share

- Earnings per share (EPS) is the monetary value of earnings per outstanding share of common stock for a company.
- Earnings per share (EPS) is calculated as a company's profit divided by the outstanding shares of its common stock. The resulting number serves as an indicator of a company's profitability

$$EPS = \frac{\text{net income} - \text{dividend payments}}{\text{weighted average shares outstanding}}$$

KPI-3: Which Sector (Average profit per stock) and company have the highest profit per stock.

4- Dividend Yield

The dividend yield or dividend–price ratio of a share is the dividend per share, divided by the price per share. It is also a company's total annual dividend payments divided by its market capitalization, assuming the number of shares is constant. It is often expressed as a percentage.

Dividend yield is used to calculate the earnings on investment (shares) considering only the returns in the form of total dividends declared by the company during the year.

$$Dividend\ Yield = \frac{Annual\ Dividend}{Current\ Stock\ Price}$$

Current Yield: 1.38% -2.57 bps

4:00 PM EST, Wed Mar 2

Mean:	4.29%	
Median:	4.25%	
Min:	1.11%	(Aug 2000)
Max:	13.84%	(Jun 1932)

KPI-4: Any dividend yields higher than current yield will be considered as startup and vice versa.

5-Price to Sales

The price-to-sales (P/S) ratio is a valuation ratio that compares a company's stock price to its revenues. It is an indicator of the value that financial markets have placed on each dollar of a company's sales or revenues.

A low ratio may indicate the stock is undervalued, while a ratio that is significantly above the average may suggest overvaluation.

$$\text{P/S Ratio} = \frac{MVS}{SPS}$$

where:

$MVS = \text{Market Value per Share}$

$SPS = \text{Sales per Share}$

KPI-5: Know companies that have overvalues and undervalues for each sector.

Data Sources

1-S&P 500 Stocks

The Standard and Poor's 500 or S&P 500 is the most famous financial benchmark in the world.

This stock market index tracks the performance of 500 large companies listed on stock exchanges in the United States. As of December 31, 2020, more than $5.4 trillion was invested in assets tied to the performance of this index.

Because the index includes multiple classes of stock of some constituent companies—for example, Alphabet's Class A (GOOGL) and Class C (GOOG)—there are 505 stocks in the gauge.

ETL: Our team downloaded the csv data from Kaggle

Exchange Exchange where its stocks are negociated.	Symbol Stock symbol	Shortname Company short name	Longname Company long name	Sector Sector where the company operates
NYQ 70% NMS 29% Other (2) 0%	500 unique values	496 unique values	495 unique values	Technology 14% Industrials 14% Other (356) 71%
NMS	AAPL	Apple Inc.	Apple Inc.	Technology
NMS	MSFT	Microsoft Corporation	Microsoft Corporation	Technology
NMS	GOOG	Alphabet Inc.	Alphabet Inc.	Communication Services
NMS	GOOGL	Alphabet Inc.	Alphabet Inc.	Communication Services
NMS	AMZN	Amazon.com, Inc.	Amazon.com, Inc.	Consumer Cyclical
NMS	TSLA	Tesla, Inc.	Tesla, Inc.	Consumer Cyclical

S&P 500 Stocks (daily updated) | Kaggle

2-Uber Technologies, Inc. (UBER)

ETL: Our team downloaded the csv data in addition to the xlsx from the website

Summary | Chart | Conversations | Statistics | Historical Data | Profile | Financials | Analysis | Options | Holders | Sustainability

Previous Close	30.41	Market Cap	60.119B
Open	30.86	Beta (5Y Monthly)	1.32
Bid	30.50 x 1300	PE Ratio (TTM)	N/A
Ask	30.55 x 1300	EPS (TTM)	-0.28
Day's Range	30.42 - 31.39	Earnings Date	May 03, 2022 - May 09, 2022
52 Week Range	28.28 - 61.50	Forward Dividend & Yield	N/A (N/A)
Volume	28,563,405	Ex-Dividend Date	N/A
Avg. Volume	33,513,101	1y Target Est	59.91

Currency in USD

Download

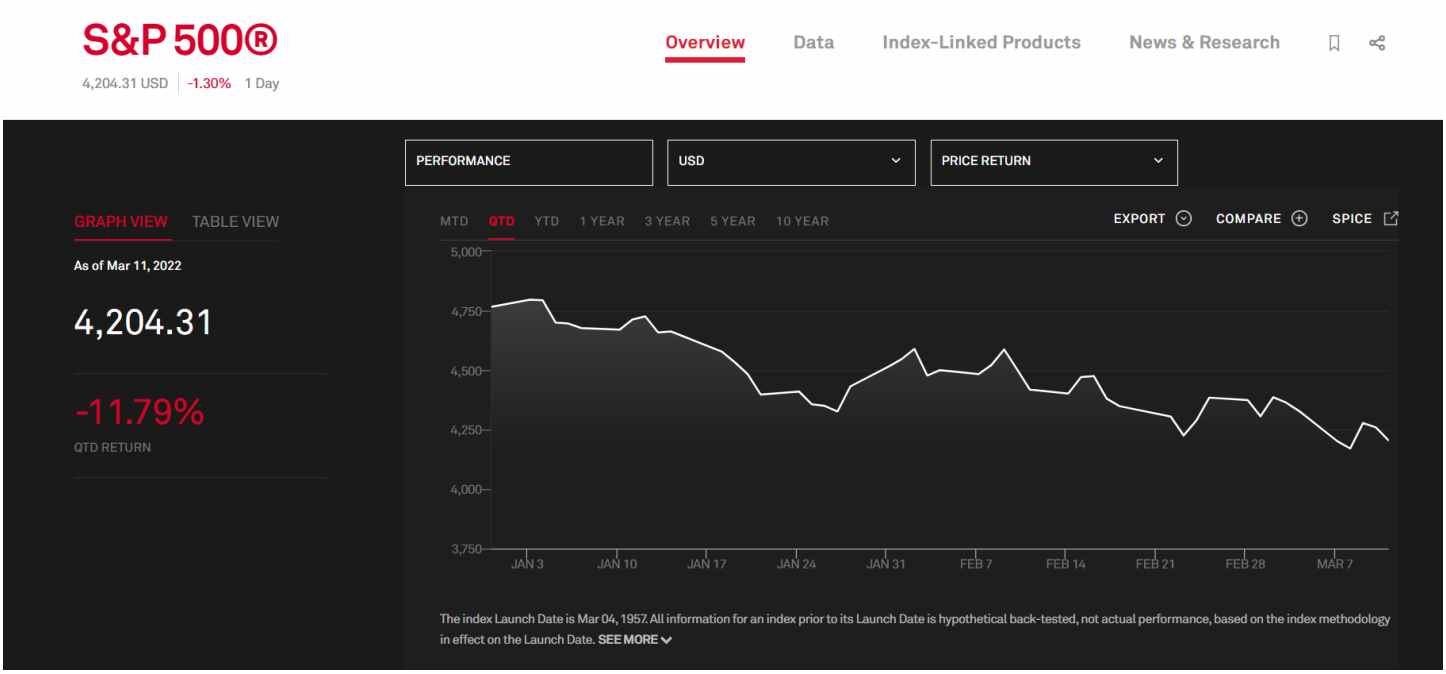
Date	Open	High	Low	Close*	Adj Close**	Volume
Mar 11, 2022	30.86	31.39	30.42	30.76	30.76	28,563,405
Mar 11, 2022	31.30	31.39	30.42	30.76	30.76	29,422,600
Mar 10, 2022	30.86	31.15	29.84	30.41	30.41	30,785,900
Mar 09, 2022	31.75	32.73	31.20	31.50	31.50	33,734,500
Mar 08, 2022	28.51	31.57	28.28	30.74	30.74	55,014,700
Mar 07, 2022	31.48	31.94	28.55	28.57	28.57	60,265,800
Mar 04, 2022	31.50	31.73	29.27	29.83	29.83	52,098,700
Mar 03, 2022	34.22	34.29	31.42	31.72	31.72	38,337,600
Mar 02, 2022	34.00	34.22	32.97	34.04	34.04	26,112,500

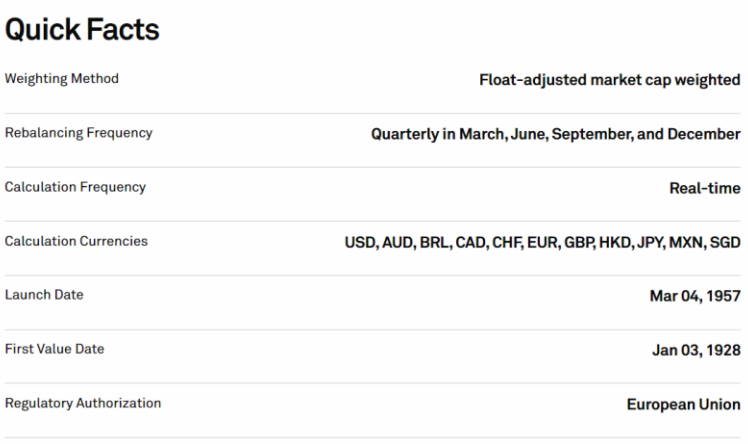
Uber Technologies, Inc. (UBER)

3- S&P 500®

The S&P 500® is widely regarded as the best single gauge of large-cap U.S. equities. According to our Annual Survey of Assets, an estimated USD 13.5 trillion is indexed or benchmarked to the index, with indexed assets comprising approximately USD 5.4 trillion of this total (as of Dec. 31, 2020). The index includes 500 leading companies and covers approximately 80% of available market capitalization.

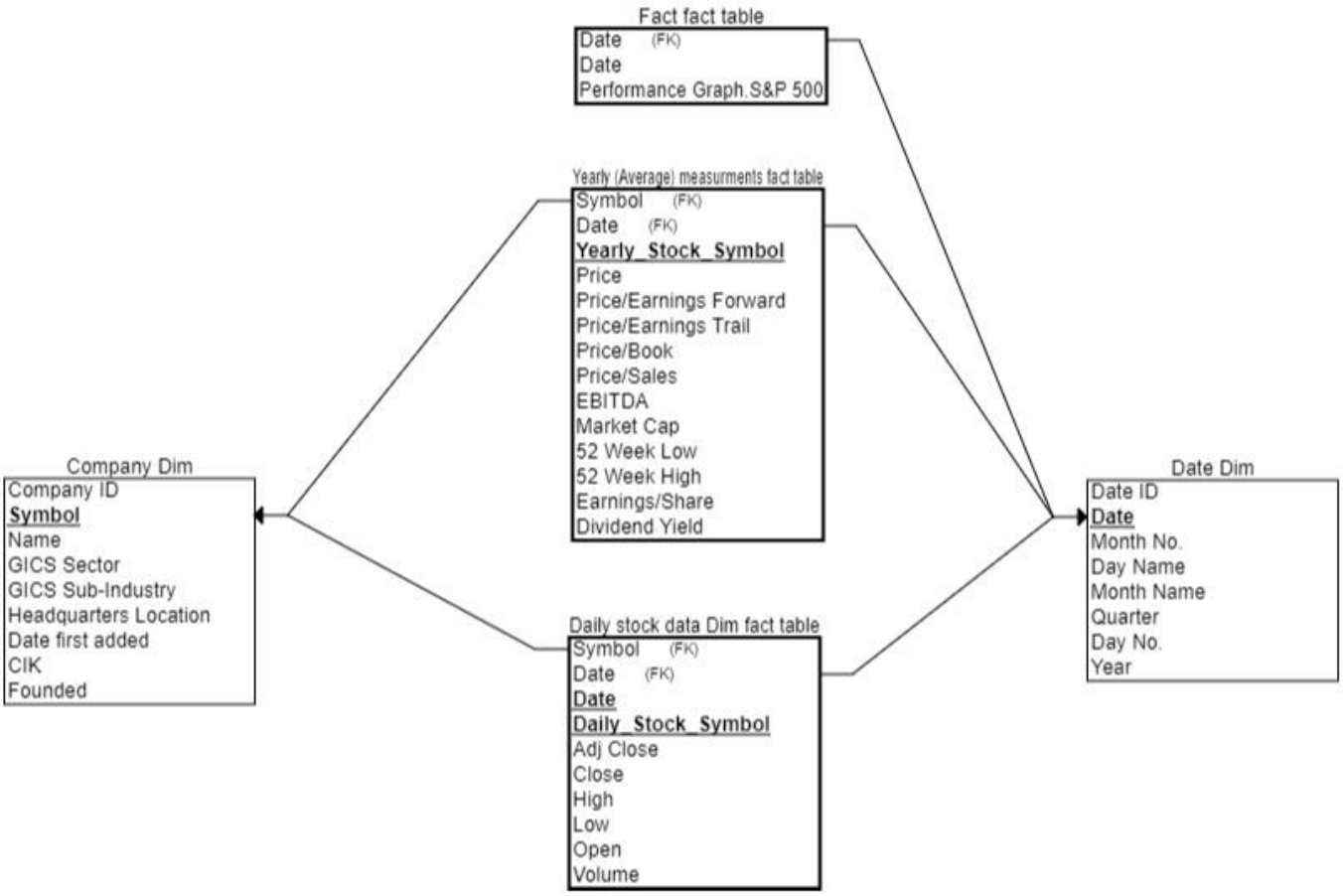
ETL: Our team downloaded the excel data from the website





S&P 500®

Data Warehouse Data Model



Our team designed the data warehouse model in the shape of Galaxy Schema.

We believe that galaxy schema is the best model for our case because we want to analyze numerical entities, but we have two levels of granularities which forces us to use two fact tables, so galaxy schema is the approach for our method.

Fact tables:

1. Daily stock data
2. Yearly (average) data
3. Fact table

Dimensions:

1. Company Dim
2. Date Dim

Pros of the used schema:

- Its multidimensional nature helps in structuring complex Database systems efficiently.
- Minimum or no redundancy, as a result of Normalization.
- This is a flexible Schema, considering the complexity of the system.
- Data Quality will be fine, as Normalization provides the advantage for well-defined tables/ data formats.
- When queried with Joins, clear & accurate data can be extracted.
- High Data quality & accuracy helps in creating exceptional Reporting & Analytical results.

Cons of the used schema:

- Galaxy schema can be Complex in structure.
- Working on this schema is tedious, as the complexity in both Schema and database systems makes it more intricate altogether.
- Data retrieval is done with multi-level joins combined with conditional expressions.
- The number of levels of normalization is expected, depending on the depth of the given database.
- Maintenance and support tasks get difficult as Galaxy schema is applied for larger database systems with complex structures.
- Large storage space is required for its larger design arrangement and detailed querying process.
- The analysis gets difficult, as it has no limitation on how many fact and dimension tables it can have.

Logical Data Mapping

Source Table Name	Column	Data Type	PK	Table Type	Data Source
COMPANY_DIM	Symbol	VARCHAR2(25)	Y	Dimension	Dim Company
COMPANY_DIM	Company_Name	VARCHAR2(50)		Dimension	Dim Company
COMPANY_DIM	GICS_Sector	VARCHAR2(50)		Dimension	Dim Company
COMPANY_DIM	GICS_Sub_Industry	VARCHAR2(100)		Dimension	Dim Company
COMPANY_DIM	Headquarters_Location	VARCHAR2(100)		Dimension	Dim Company
COMPANY_DIM	Date_First_Added	Date		Dimension	Dim Company
COMPANY_DIM	CIK	NUMBER (12,2)		Dimension	Dim Company
COMPANY_DIM	Founded	NUMBER (5)		Dimension	Dim Company

Source Table Name	Column	Data Type	PK	Table Type	Data Source
DAILY_STOCKS_DATA_FACT	Day_Date	DATE	Y	Fact	Dim Daily stocks data
DAILY_STOCKS_DATA_FACT	Symbol	VARCHAR2(50)	Y	Fact	Dim Daily stocks data
DAILY_STOCKS_DATA_FACT	Adj_Close	NUMBER(12,6)		Fact	Dim Daily stocks data
DAILY_STOCKS_DATA_FACT	Close_Price	NUMBER(12,6)		Fact	Dim Daily stocks data
DAILY_STOCKS_DATA_FACT	Open_Price	NUMBER(12,6)		Fact	Dim Daily stocks data
DAILY_STOCKS_DATA_FACT	High_Price	NUMBER(12,6)		Fact	Dim Daily stocks data
DAILY_STOCKS_DATA_FACT	Low_Price	NUMBER(12,6)		Fact	Dim Daily stocks data
DAILY_STOCKS_DATA_FACT	Volume	NUMBER(15)		Fact	Dim Daily stocks data
DAILY_STOCKS_DATA_FACT	Performance_General_Stock	NUMBER(12,6)		Fact	Dim Daily stocks data

Source Table Name	Column	Data Type	PK	Table Type	Data Source
DATE_DIM	Day_Date	DATE	Y	Dimension	Dim Date
DATE_DIM	Month_Number	NUMBER(6)		Dimension	Dim Date
DATE_DIM	Day_Name	VARCHAR2(25)		Dimension	Dim Date
DATE_DIM	Month_Name	VARCHAR2(25)		Dimension	Dim Date
DATE_DIM	Quarter	VARCHAR2(5)		Dimension	Dim Date
DATE_DIM	Year_No	NUMBER(5)		Dimension	Dim Date
DATE_DIM	Day_Number	NUMBER(3)		Dimension	Dim Date

Source Table Name	Column	Data Type	PK	Table Type	Data Source
YEARLY_AVERAGE_MEASURMENT_FACT	Symbol	VARCHAR2(25)	Y	Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	Price	NUMBER(8,2)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	Price_Per_Earnings_Forward	NUMBER(8,2)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	Dividend_Yield	NUMBER(10,6)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	Earnings_Per_Share	NUMBER(6,2)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	fiftytwo_Week_High	NUMBER(7,2)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	fiftytwo_Week_Low	NUMBER(10,4)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	Market_Cap	NUMBER(14)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	EBITDA	NUMBER(14)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	Price_Per_Sales	NUMBER(10,6)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	Price_Per_Book	NUMBER(6,2)		Fact	Dim yearly (average) measurments
YEARLY_AVERAGE_MEASURMENT_FACT	Price_Per_Earnings_Trail	NUMBER(12,6)		Fact	Dim yearly (average) measurments

Source Table Name	Column	Data Type	PK	Table Type	Data Source
Performance_General_Stock_Fact	Daily_Date	DATE	Y	Fact	Copy of PerformanceGraphExpo (1)
Performance_General_Stock_Fact	General_Stock_Value	NUMBER(12,6)		Fact	Copy of PerformanceGraphExpo (1)

Queries

1- Creation Queries:

```
 CREATE TABLE COMPANY_DIM
(
 Symbol VARCHAR2(25) CONSTRAINT Symbol_PK PRIMARY KEY,
 Company_Name VARCHAR2(50),
 GICS_Sector VARCHAR2(50),
 GICS_Sub_Industry VARCHAR2(100),
 Headquarters_Location VARCHAR2(100),
 Date_First_Added Date,
 CIK NUMBER(12,2),
 Founded NUMBER(5)
);

  CREATE TABLE DAILY_STOCKS_DATA_FACT
(
 Day_Date DATE ,
 Symbol VARCHAR2(50),
 Adj_Close NUMBER(12,6),
 Close_Price NUMBER(12,6),
 Open_Price NUMBER(12,6),
 High_Price NUMBER(12,6),
 Low_Price NUMBER(12,6),
 Volume NUMBER(15),
 Performance_General_Stock NUMBER(12,6),
 CONSTRAINT Comp_PK PRIMARY KEY (Day_Date,Symbol)
);
```

CREATE TABLE **DATE_DIM**

```
(
 Date_Day  DATE CONSTRAINT Date_PK PRIMARY KEY,
 Month_Number NUMBER(6),
 Day_Name VARCHAR2(25),
 Month_Name VARCHAR2(25),
 Quarter VARCHAR2(5),
 Year_No NUMBER(5),
 Day_Number NUMBER(3)
);
```

CREATE TABLE **YEARLY_AVERAGE_MEASURMENT_FACT**

```
(
 Symbol VARCHAR2(25) CONSTRAINT Symbol_Yearly_PK PRIMARY KEY,
 Price NUMBER(8,2),
 Price_Per_Earnings_Forward NUMBER(8,2),
 Dividend_Yield NUMBER(10,6),
 Earnings_Per_Share NUMBER(6,2),
 fiftytwo_Week_High NUMBER(7,2),
 fiftytwo_Week_Low NUMBER(10,4),
 Market_Cap NUMBER(14),
 EBITDA NUMBER(14),
 Price_Per_Sales NUMBER(10,6),
 Price_Per_Book NUMBER(6,2),
 Price_Per_Earnings_Trail NUMBER(12,6)
);
```

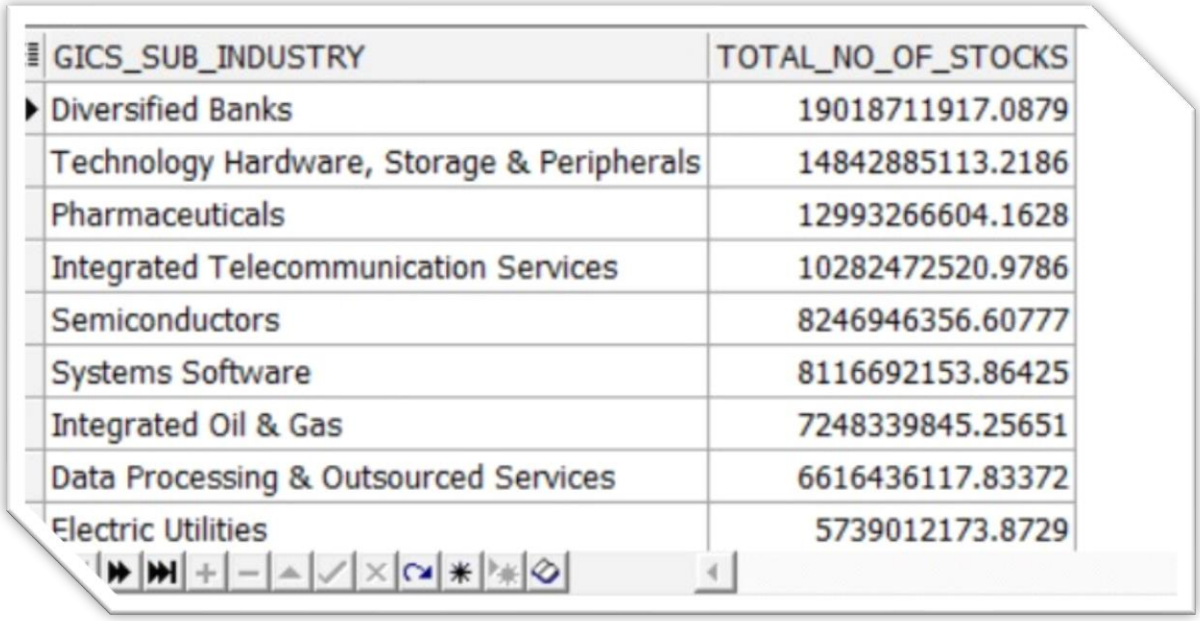
CREATE TABLE **Performance_General_Stock_Fact**

```
(
```

```
  Daily_Date  DATE CONSTRAINT Daily_Date_PK PRIMARY KEY,
  General_Stock_Value NUMBER(12,6)
 );
```

2-Query 1

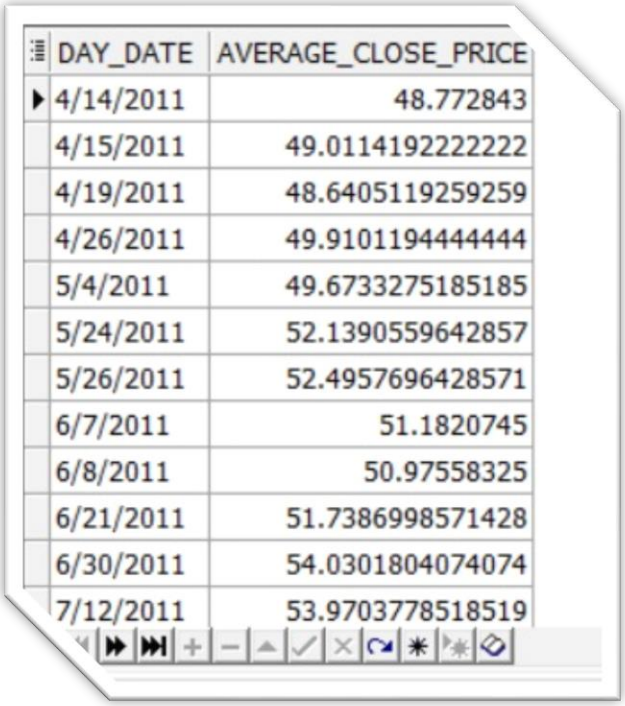
```
SELECT GICS_Sub_Industry, SUM (Market_Cap) / AVG (Price) AS TOTAL_NO_OF_STOCKS
FROM COMPANY_DIM COM, YEARLY_AVERAGE_MEASURMENT_FACT YEARLY
WHERE COM.SYMBOL = YEARLY.SYMBOL
GROUP BY GICS_Sub_Industry
ORDER  BY TOTAL_NO_OF_STOCKS DESC;
```



GICS_SUB_INDUSTRY	TOTAL_NO_OF_STOCKS
Diversified Banks	19018711917.0879
Technology Hardware, Storage & Peripherals	14842885113.2186
Pharmaceuticals	12993266604.1628
Integrated Telecommunication Services	10282472520.9786
Semiconductors	8246946356.60777
Systems Software	8116692153.86425
Integrated Oil & Gas	7248339845.25651
Data Processing & Outsourced Services	6616436117.83372
Electric Utilities	5739012173.8729

3-Query 2

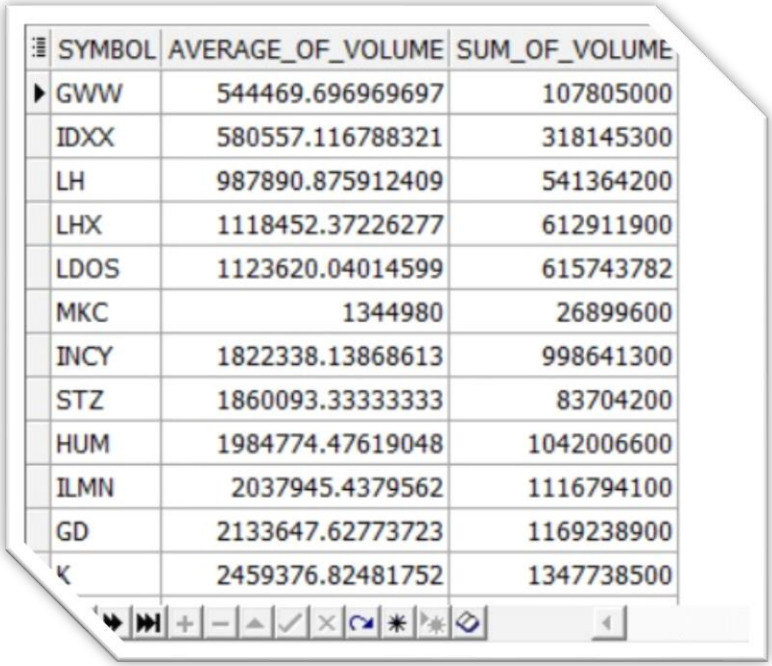
```
SELECT DAY_DATE, AVG(CLOSE_PRICE)
FROM DAILY_STOCKS_DATA_FACT
GROUP BY DAY_DATE;
```



DAY_DATE	AVERAGE_CLOSE_PRICE
4/14/2011	48.772843
4/15/2011	49.0114192222222
4/19/2011	48.6405119259259
4/26/2011	49.9101194444444
5/4/2011	49.6733275185185
5/24/2011	52.1390559642857
5/26/2011	52.4957696428571
6/7/2011	51.1820745
6/8/2011	50.97558325
6/21/2011	51.7386998571428
6/30/2011	54.0301804074074
7/12/2011	53.9703778518519

4-Query 3

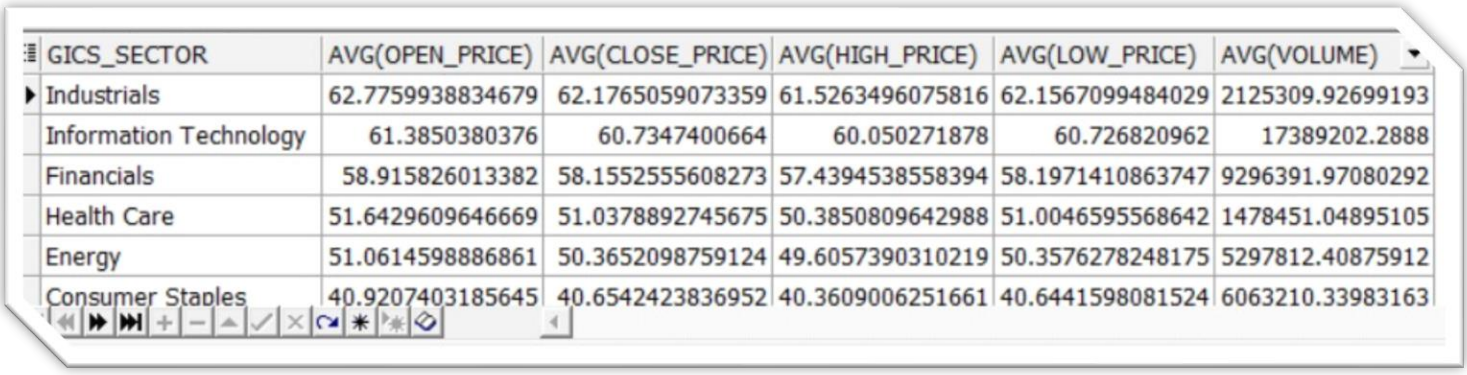
```
SELECT SYMBOL, AVG(VOLUME), SUM(VOLUME)
FROM DAILY_STOCKS_DATA_FACT
GROUP BY SYMBOL
ORDER BY AVG(VOLUME) ;
```



SYMBOL	AVERAGE_OF_VOLUME	SUM_OF_VOLUME
GWW	544469.696969697	107805000
IDXX	580557.116788321	318145300
LH	987890.875912409	541364200
LHX	1118452.37226277	612911900
LDOS	1123620.04014599	615743782
MKC	1344980	26899600
INCY	1822338.13868613	998641300
STZ	1860093.33333333	83704200
HUM	1984774.47619048	1042006600
ILMN	2037945.4379562	1116794100
GD	2133647.62773723	1169238900
K	2459376.82481752	1347738500

5-Query 4

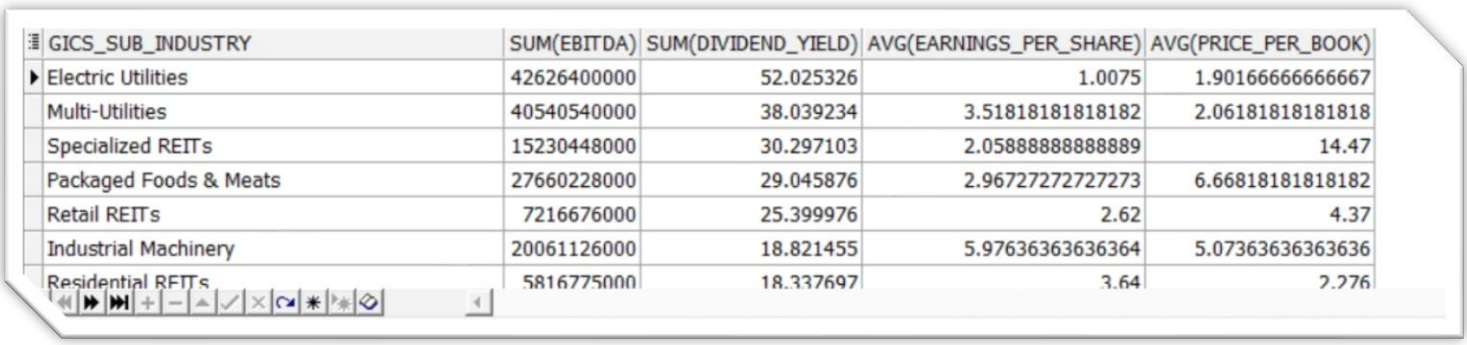
```
SELECT GICS_Sector, AVG (OPEN_PRICE) ,AVG(CLOSE_PRICE), AVG (HIGH_PRICE), AVG
(LOW_PRICE), AVG (VOLUME)

FROM COMPANY_DIM COM, DAILY_STOCKS_DATA_FACT DAILY

WHERE COM.SYMBOL = DAILY.SYMBOL

GROUP BY GICS_Sector

ORDER  BY AVG(CLOSE_PRICE) DESC;
```



GICS_SECTOR	AVG(OPEN_PRICE)	AVG(CLOSE_PRICE)	AVG(HIGH_PRICE)	AVG(LOW_PRICE)	AVG(VOLUME)
Industrials	62.7759938834679	62.1765059073359	61.5263496075816	62.1567099484029	2125309.92699193
Information Technology	61.3850380376	60.7347400664	60.050271878	60.726820962	17389202.2888
Financials	58.915826013382	58.1552555608273	57.4394538558394	58.1971410863747	9296391.97080292
Health Care	51.6429609646669	51.0378892745675	50.3850809642988	51.0046595568642	1478451.04895105
Energy	51.0614598886861	50.3652098759124	49.6057390310219	50.3576278248175	5297812.40875912
Consumer Staples	40.9207403185645	40.6542423836952	40.3609006251661	40.6441598081524	6063210.33983163

6- Query 5

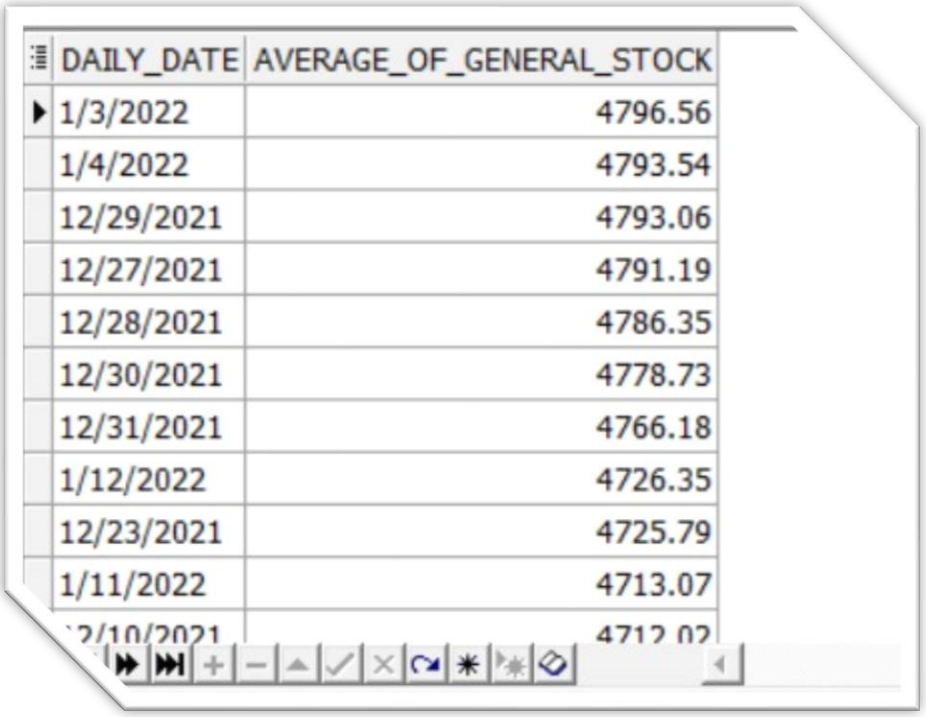
```
SELECT GICS_Sub_Industry, SUM (EBITDA) ,SUM (Dividend_Yield),AVG(Earnings_Per_Share)
,AVG (Price_Per_Book)

FROM COMPANY_DIM COM, YEARLY_AVERAGE_MEASURMENT_FACT YEARLY

WHERE COM.SYMBOL = YEARLY.SYMBOL

GROUP BY GICS_Sub_Industry

ORDER  BY SUM (Dividend_Yield) DESC;
```



GICS_SUB_INDUSTRY	SUM(EBITDA)	SUM(DIVIDEND_YIELD)	AVG(EARNINGS_PER_SHARE)	AVG(PRICE_PER_BOOK)
Electric Utilities	42626400000	52.025326	1.0075	1.90166666666667
Multi-Utilities	40540540000	38.039234	3.51818181818182	2.06181818181818
Specialized REITs	15230448000	30.297103	2.05888888888889	14.47
Packaged Foods & Meats	27660228000	29.045876	2.96727272727273	6.66818181818182
Retail REITs	7216676000	25.399976	2.62	4.37
Industrial Machinery	20061126000	18.821455	5.97636363636364	5.07363636363636
Residential REITs	5816775000	18.337697	3.64	2.276

6- Query 6

```
SELECT  AVG(General_Stock_Value)
FROM Performance_General_Stock_Fact
GROUP BY DAILY_DATE
ORDER BY AVG(General_Stock_Value) DESC ;
```



DAILY_DATE	AVERAGE_OF_GENERAL_STOCK
1/3/2022	4796.56
1/4/2022	4793.54
12/29/2021	4793.06
12/27/2021	4791.19
12/28/2021	4786.35
12/30/2021	4778.73
12/31/2021	4766.18
1/12/2022	4726.35
12/23/2021	4725.79
1/11/2022	4713.07
12/10/2021	4712.02

Dashboards

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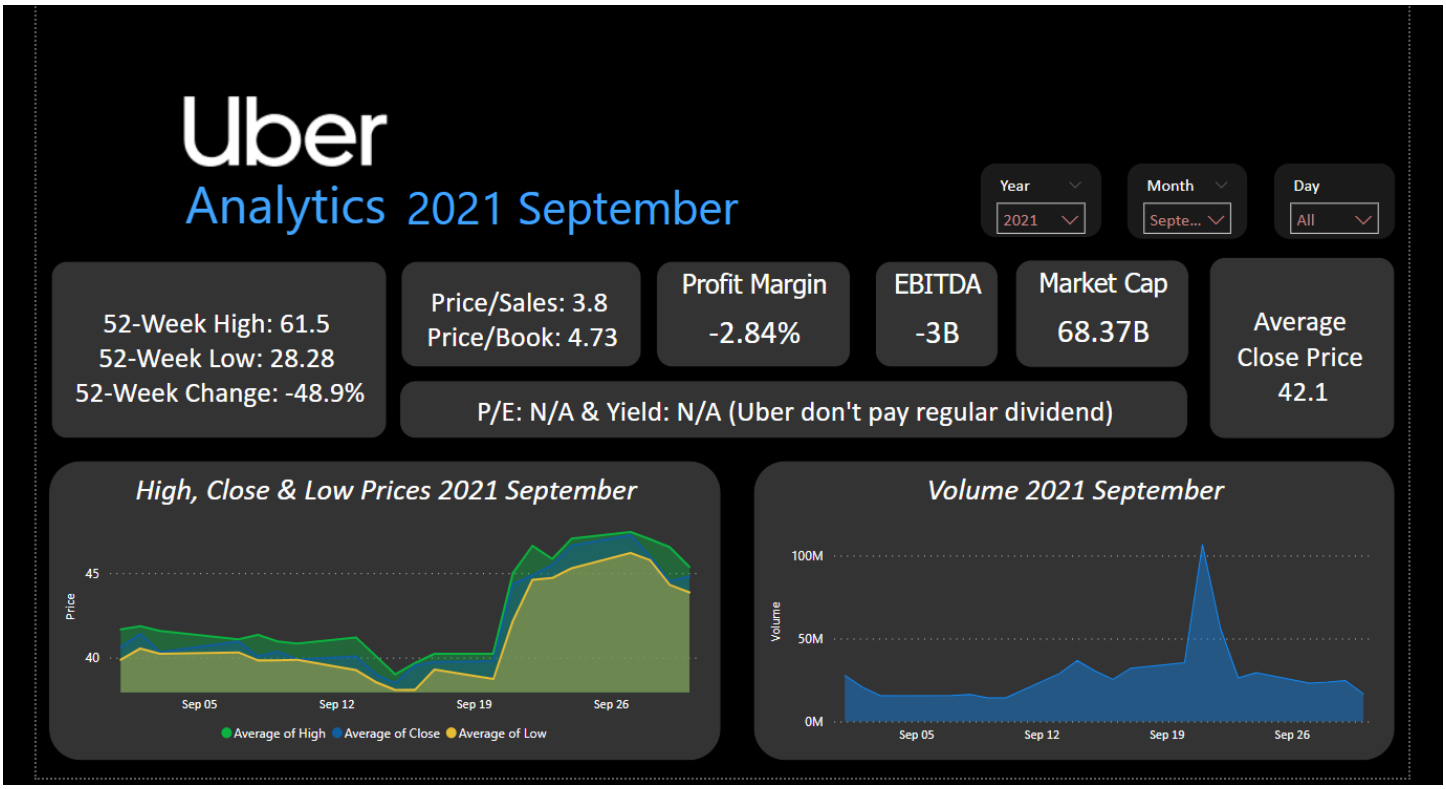
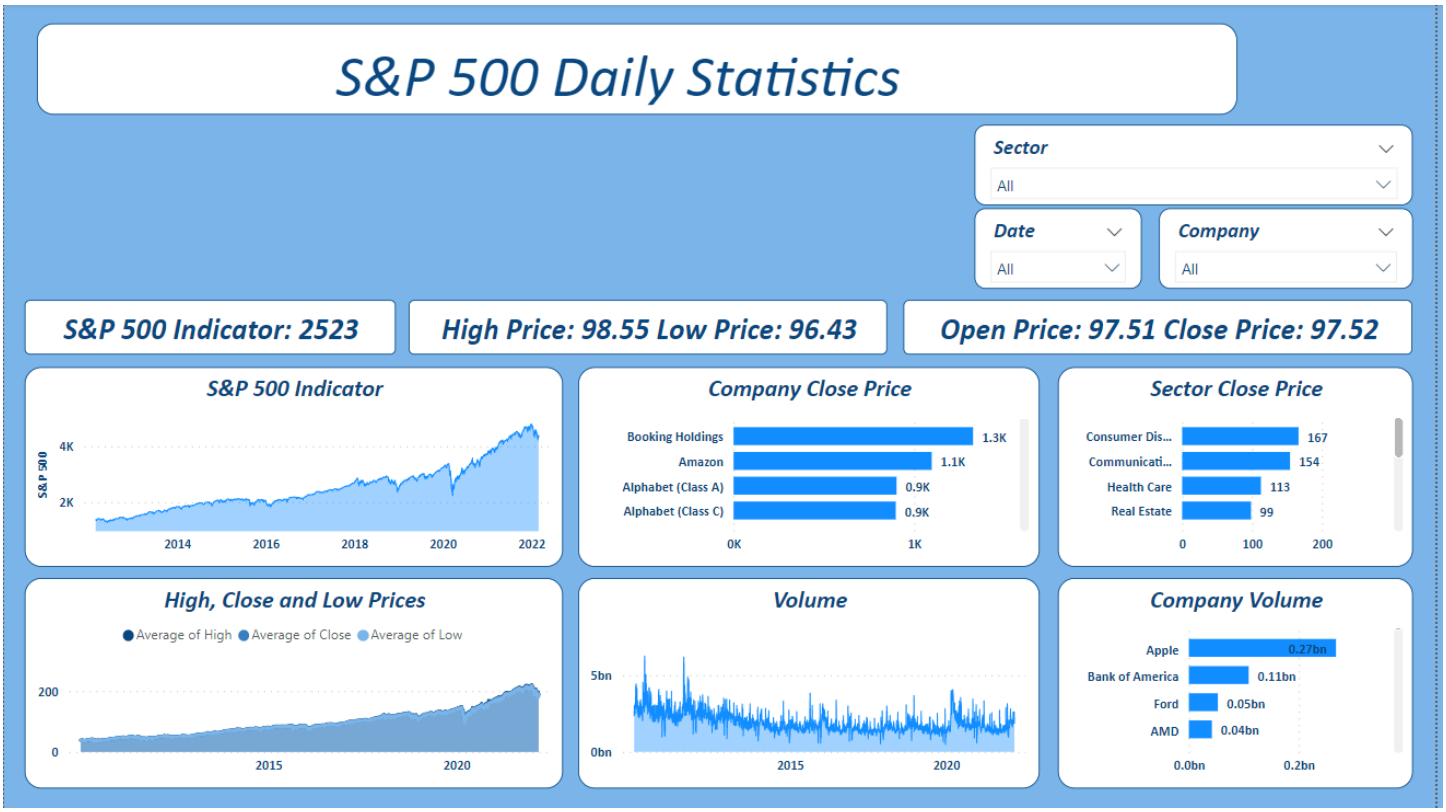


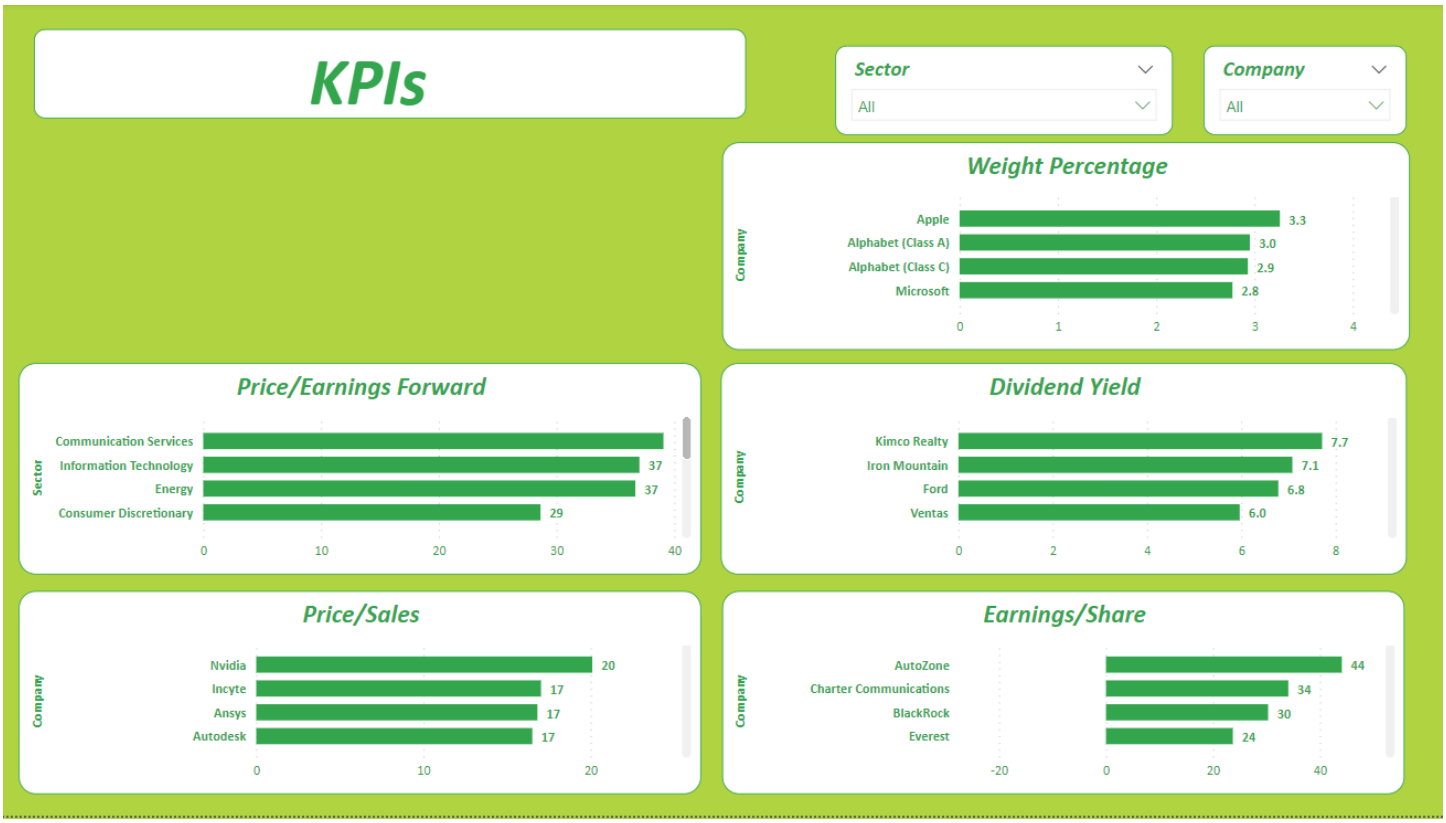
This is an analysis of Uber stocks during the last 4 years.

This dashboard can tell the story of what Uber went through in the last couple of years specially COVID-19 days because that was a critical hit to its business.



This page represents daily statistics of the S&P 500

You can also see Sector/Sub sector stats, or even company stats



This page indicates the KPI which our team demonstrated in the KPIs section, and it's very important as it's the major business metric

Conclusion

In the beginning, Every one of our team checked the data and studied it carefully. We brainstormed together to be on the same land.

- We gathered outsource data
- Extracted and loading the data
- Explored the data
- Defining our Data Model
- Creating queries
- Extracting useful information from the queries
- Loading the data into Power BI
- Creating dashboards

In the end, we believe that our project delivered its purpose and it gave you a strong idea about the stocks market, maybe you can invest into it in the future someday with the help of this project.

As a future work, we're studying on implementing an AI script that keeps tracking of the current 500 S&P stocks and helps you in deciding which shares to buy and when to sell them to gain maximum profit.

We hope this project helped you.