STOCK MARKET ANALYSIS

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ABSTRACT

Stock market analysis is a pivotal tool in understanding the dynamics of financial markets, aiding investors, researchers, and policymakers in making informed decisions. This abstract delves into the world of stock market analysis, encompassing both traditional methods and contemporary techniques utilizing data-driven insights, statistical models, and cutting-edge technologies.

The abstract navigates through fundamental analysis, where financial statements and economic indicators are scrutinized to assess a company's intrinsic value. It explores technical analysis, leveraging historical price data and trading volumes to predict future market movements. Moreover, the abstract delves into sentiment analysis, utilizing natural language processing and machine learning algorithms to gauge market sentiment from news articles, social media, and other textual sources.

Incorporating Python, a versatile programming language, the abstract showcases how data manipulation, statistical analysis, and visualization techniques are seamlessly integrated to extract meaningful patterns from stock market data. Python libraries like Pandas, NumPy, and Matplotlib empower analysts to process large datasets, perform statistical calculations, and create insightful visualizations, enhancing the decision-making process.

Furthermore, the abstract explores the role of Tableau, a powerful data visualization tool, in transforming raw data into interactive and visually appealing dashboards. Tableau enables users to explore trends, correlations, and outliers in stock market data, fostering a deeper understanding of market behavior and investor sentiment.

The abstract also emphasizes the importance of data-driven insights derived from historical stock prices, trading volumes, and market indicators. These insights facilitate trend analysis, volatility predictions, and risk assessments, enabling stakeholders to devise robust investment strategies and optimize portfolio management.

In conclusion, this abstract illuminates the multifaceted realm of stock market analysis, highlighting the synergy between traditional financial methodologies and advanced data analytics. By harnessing the power of Python and Tableau, analysts can unravel intricate market patterns, providing valuable insights for effective decision-making in the complex and ever-changing landscape of financial markets.

INTRODUCTION

In the realm of financial analysis, understanding historical stock market data is crucial for making informed investment decisions. This study leverages a comprehensive dataset titled "Stock Market Stars: Historical Data of Top 10 Companies," consisting of 25,161 rows obtained through web scraping from www.nasdaq.com. The dataset meticulously captures stock prices and trading volumes for renowned companies like Apple, Starbucks, Microsoft, Cisco Systems, Qualcomm, Meta, Amazon.com, Tesla, Advanced Micro Devices, and Netflix.

About the Dataset

The dataset, shared on Kaggle, serves as a valuable resource for enthusiasts delving into stock market analysis and data science. It is important to note that this dataset is intended exclusively for educational and research purposes. The data's compilation involved web scraping from public sources in good faith, yet users are encouraged to exercise caution. While efforts were made to ensure accuracy, the dataset may contain errors or omissions. Users are responsible for verifying data integrity for their specific applications and utilizing it at their own risk.
This dataset contains about companies, we have 10 companies such as Apple, Amazon, Cisco systems, Microsoft, meta, Netflix, advance micro devices, Qualcomm, Starbucks, tesla and The date on which the stock market data was recorded or reported. It represents the trading day, (Close/last) The closing price or the last traded price of the company's stock on the given date. It represents the final price at which, (volume) The total number of shares of the company's stock traded on the given date. It indicates the level of investor interest and The opening price of the company's stock on the given date. It is the price at which the first trade occurred during, the highest price at which the company's stock traded on the given date. It indicates the highest price reached, the lowest price at which the company's stock traded on the given date. It indicates the lowest price reached during the

Dataset Usage Guidelines

Users accessing this dataset must adhere to the provided terms and conditions, limiting its usage strictly to educational and research endeavors. Commercial or legal applications are discouraged, especially for financial or investment decisions. Any reliance on the dataset for such purposes is not recommended. The dataset's contents, including stock market data and company names, are subject to copyright and proprietary rights. Users are expected to comply with all applicable laws and regulations regarding data usage, intellectual property, and other legal obligations.

Research Objectives

This study aims to explore trends, patterns, and insights within the historical stock market data of the top 10 companies. Leveraging Python for data analysis and Tableau for visualization, the research endeavors to uncover meaningful correlations, assess market volatility, and gain valuable insights into the companies' performance. By employing advanced analytical techniques, the study seeks to provide a nuanced understanding of the stock market dynamics, enabling stakeholders to make well-informed decisions.

In summary, this research embarks on a data-driven journey, utilizing a rich dataset to unravel the complexities of stock market behavior. Through a combination of robust methodologies and cutting-edge tools, the study endeavors to offer valuable insights and contribute to the broader landscape of financial analysis and investment strategies.

TOOLS USED FOR THIS ANALYSIS

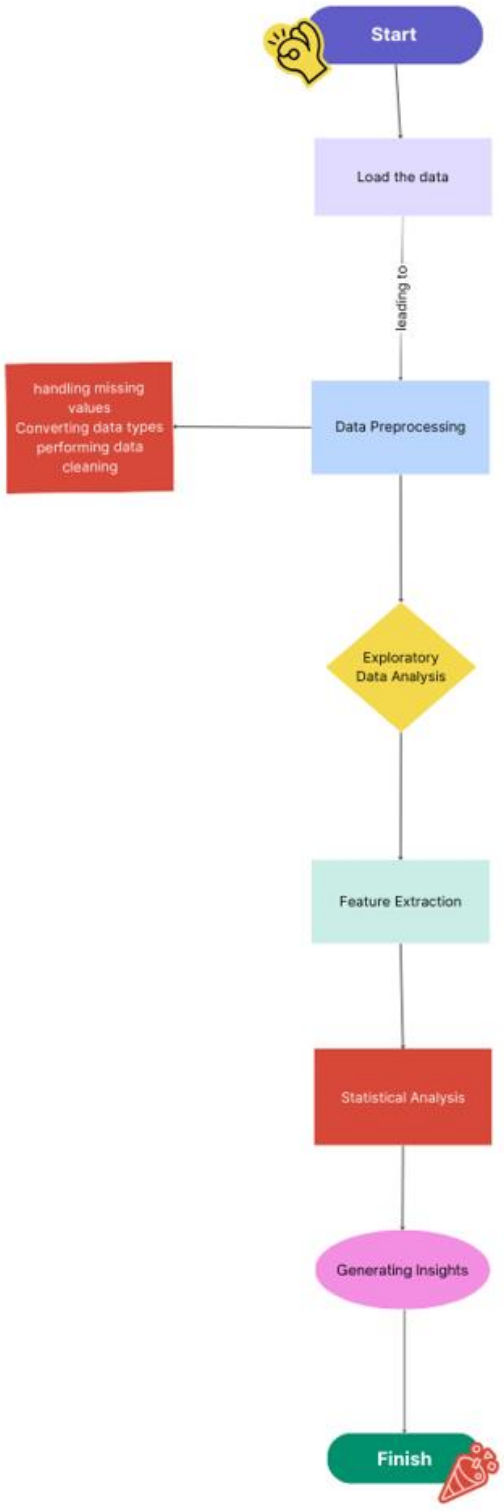
The below are the tools used in this analysis

- Jupyter Notebook

Python modules such as numpy, pandas, matplot.lib, seaborn,

- Tableau Public

UNIFIED MODELLING LANGUAGE



FEATURE EXTRACTION:

Feature analysis is a crucial step in any data analysis or machine learning project, including stock market analysis. Feature extraction in stock market analysis involves deriving meaningful and relevant information from raw financial data to enhance the understanding of market trends and facilitate better decision-making.

Moving Averages:
In our stock market analysis, moving averages play a pivotal role in identifying trends and potential entry/exit points for investments. Moving averages, such as the 50-day and 200-day moving averages, are calculated to smoothen out price data and highlight trends over a specific period. By comparing short-term (50-day) and long-term (200-day) moving averages, investors can identify potential buy signals when the short-term moving average crosses above the long-term moving average and sell signals when the opposite occurs. These moving averages help traders make informed decisions, enhancing their ability to capitalize on market trends effectively.

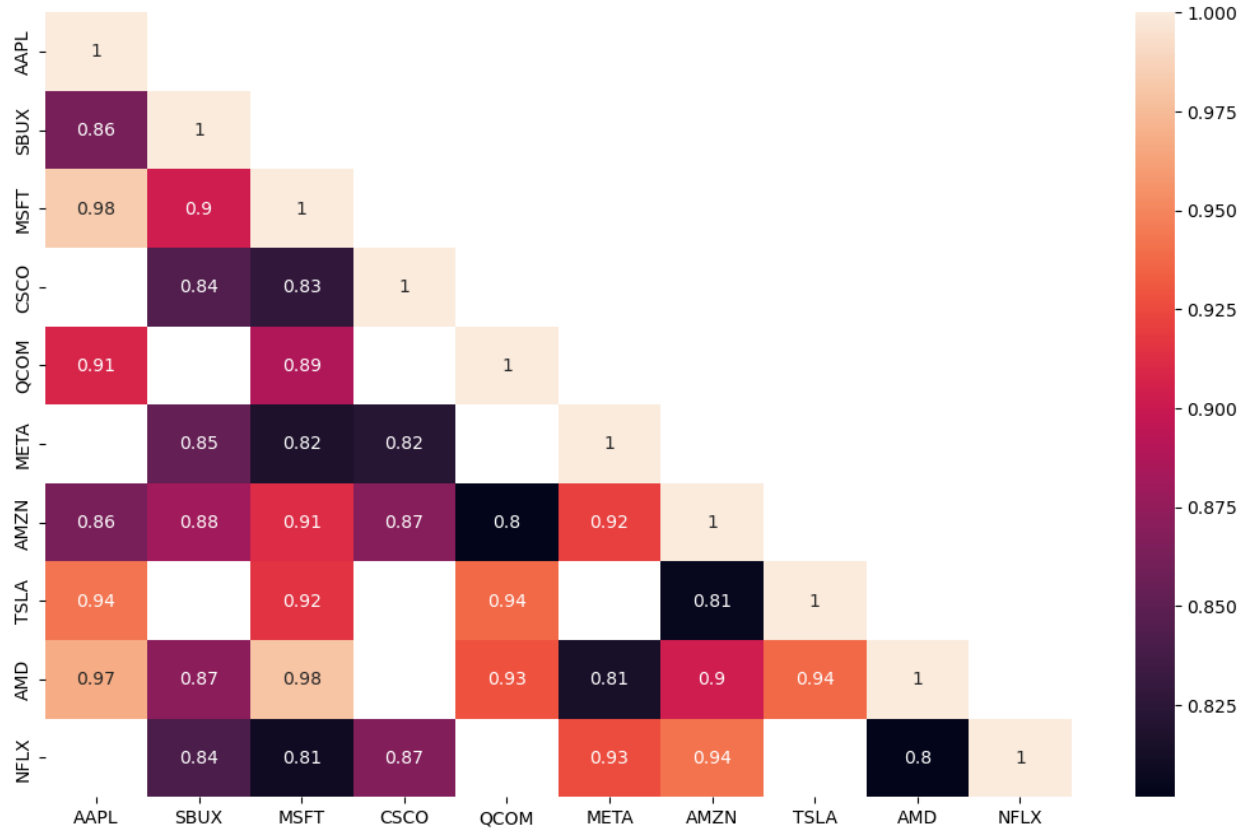
Volatility Measures:
Volatility metrics are essential in evaluating market risk and investment opportunities. In our analysis, we calculated various volatility measures such as standard deviation, beta, and average true range (ATR). Standard deviation quantifies the dispersion of stock prices from their mean, providing insights into price volatility. Beta measures a stock's sensitivity to market movements, indicating its risk relative to the overall market. ATR measures market volatility by considering the range between high and low prices. These metrics help investors assess the risk associated with specific stocks, aiding in portfolio diversification and risk management strategies.

Financial Ratios:
While not directly calculated in the provided code snippet, financial ratios such as price-to-earnings (P/E), price-to-book (P/B), and debt-to-equity are invaluable in evaluating a company's financial health and stock valuation. P/E ratio compares the stock price to its earnings per share, indicating whether the stock is overvalued or undervalued. P/B ratio assesses a company's market value concerning its book value, offering insights into its financial stability. Debt-to-equity ratio measures a company's financial leverage, highlighting its ability to meet financial obligations. Evaluating these ratios is crucial for investors seeking fundamentally strong companies and making informed investment decisions based on financial performance and market valuation.

CORRELATION ANALYSIS:

	AAPL	SBUX	MSFT	CSCO	QCOM	META	AMZN	TSLA	AMD	NFLX
AAPL	1.000000	0.861332	0.983015	0.000000	0.908325	0.000000	0.862163	0.942042	0.967910	0.000000
SBUX	0.861332	1.000000	0.902432	0.843926	0.000000	0.853233	0.881124	0.000000	0.871355	0.841024
MSFT	0.983015	0.902432	1.000000	0.827709	0.887016	0.816639	0.912394	0.915051	0.979730	0.809420
CSCO	0.000000	0.843926	0.827709	1.000000	0.000000	0.822352	0.868330	0.000000	0.000000	0.866982
QCOM	0.908325	0.000000	0.887016	0.000000	1.000000	0.000000	0.802181	0.937833	0.928158	0.000000
META	0.000000	0.853233	0.816639	0.822352	0.000000	1.000000	0.920295	0.000000	0.814296	0.925753
AMZN	0.862163	0.881124	0.912394	0.868330	0.802181	0.920295	1.000000	0.805408	0.902728	0.941439
TSLA	0.942042	0.000000	0.915051	0.000000	0.937833	0.000000	0.805408	1.000000	0.937498	0.000000
AMD	0.967910	0.871355	0.979730	0.000000	0.928158	0.814296	0.902728	0.937498	1.000000	0.801663
NFLX	0.000000	0.841024	0.809420	0.866982	0.000000	0.925753	0.941439	0.000000	0.801663	1.000000

- **High Positive Correlation:**
  Companies with correlation coefficients close to 1 (e.g., MSFT and AAPL, AMD and AAPL) have a strong positive correlation. When the stock price of one company increases, the stock price of the other tends to increase as well. Investors might notice similar trends in these companies' stocks.
- **Moderate Positive Correlation**:
  Companies with correlation coefficients between 0.7 and 0.9 (e.g., MSFT and QCOM, AAPL and AMZN) have a moderate positive correlation. Positive movements in one company's stock are moderately associated with positive movements in the other company's stock. Investors should be aware of these relationships for diversified investment strategies.
- **Weak Positive Correlation:**
  Companies with correlation coefficients between 0.5 and 0.7 (e.g., SBUX and QCOM, SBUX and MSFT) exhibit a weak positive correlation. Positive movements in one company's stock are somewhat associated with positive movements in the other company's stock, though the relationship is not very strong.
- **Weak to No Correlation:**
  Companies with correlation coefficients close to 0 (e.g., NFLX and TSLA) have a weak or no correlation. There is little to no linear relationship between the stock prices of these companies. Changes in one company's stock price do not predict changes in the other company's stock price.
- **Negative Correlation**:
  There are no instances of negative correlation in this matrix. A negative correlation coefficient (between -1 and 0) would indicate an inverse relationship, where one company's stock price increases when the other company's stock price decreases.



Correlation heat map of companies' stock prices.

STOCK PRICE TREND FOR THE COMPANIES

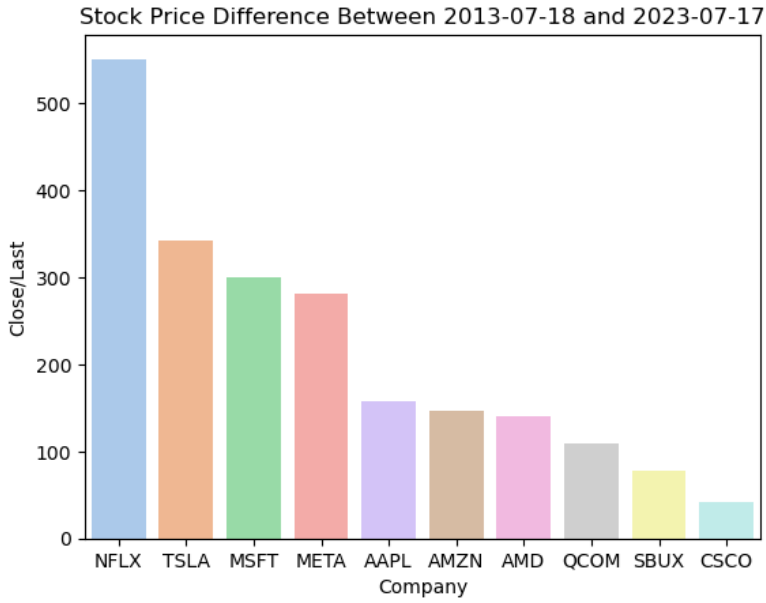
High Stock Price Difference:
NFLX (Netflix) and TSLA (Tesla) have the highest stock price differences, indicating significant fluctuations in their stock prices. Investors in these companies should be prepared for volatility and monitor market news and events that might affect these stocks.

Moderate Stock Price Difference:
MSFT (Microsoft) and META (Meta Platforms, formerly Facebook) have moderate stock price differences. Investors should stay informed about industry-specific and company-specific news and events that could impact these stocks.

Relatively Stable Stock Price Difference:
AAPL (Apple), AMZN (Amazon), AMD (Advanced Micro Devices), QCOM (Qualcomm), SBUX (Starbucks), and CSCO (Cisco) have relatively stable stock price differences compared to others.

While no stock investment is entirely without risk, these companies have shown comparatively smaller fluctuations in their stock prices recently.

Company	Close/Last
NFLX	550.6086
TSLA	342.2533
MSFT	299.1600
META	281.6400
AAPL	157.8153
AMZN	146.8185
AMD	139.9500
QCOM	109.5500
SBUX	78.3850
CSCO	41.3700



- **Low Stock Price Companies:**
  Cisco has a relatively low stock price compared to the tech giants. The company should focus on diversification, cybersecurity solutions, and cloud services to increase its market value**.**
- **Low to Mid-Range Stock Price Companies:**
  Qualcomm (QCOM): Qualcomm's stock price is lower compared to the tech giants, but it's still substantial. The company should focus on innovation in the mobile and semiconductor sectors to maintain competitiveness**.**
  Starbucks (SBUX): Starbucks has a comparatively lower stock price among the listed tech companies. The company should focus on customer experience, menu innovation, and expansion into emerging markets to drive stock price growth**.**
- **Mid-Range Stock Price Companies:**
  Apple (AAPL): Apple's mid-range stock price indicates stable performance and investor confidence. The company should concentrate on product diversification, software services, and innovation to continue appealing to consumers and investors.
  Amazon (AMZN): Amazon's stock price, while high, is not as steep as some tech giants. The company should focus on its e-commerce, cloud services, and expansion into new markets to drive stock price growth.
  Advanced Micro Devices (AMD): AMD's stock price is significant, reflecting its role in the semiconductor industry. The company should focus on research, development, and partnerships to compete effectively and maintain its position in the market.
- **High Stock Price Companies:**
  Netflix (NFLX): Netflix has the highest stock price among the listed companies, indicating its strong market position and investor confidence. The company should

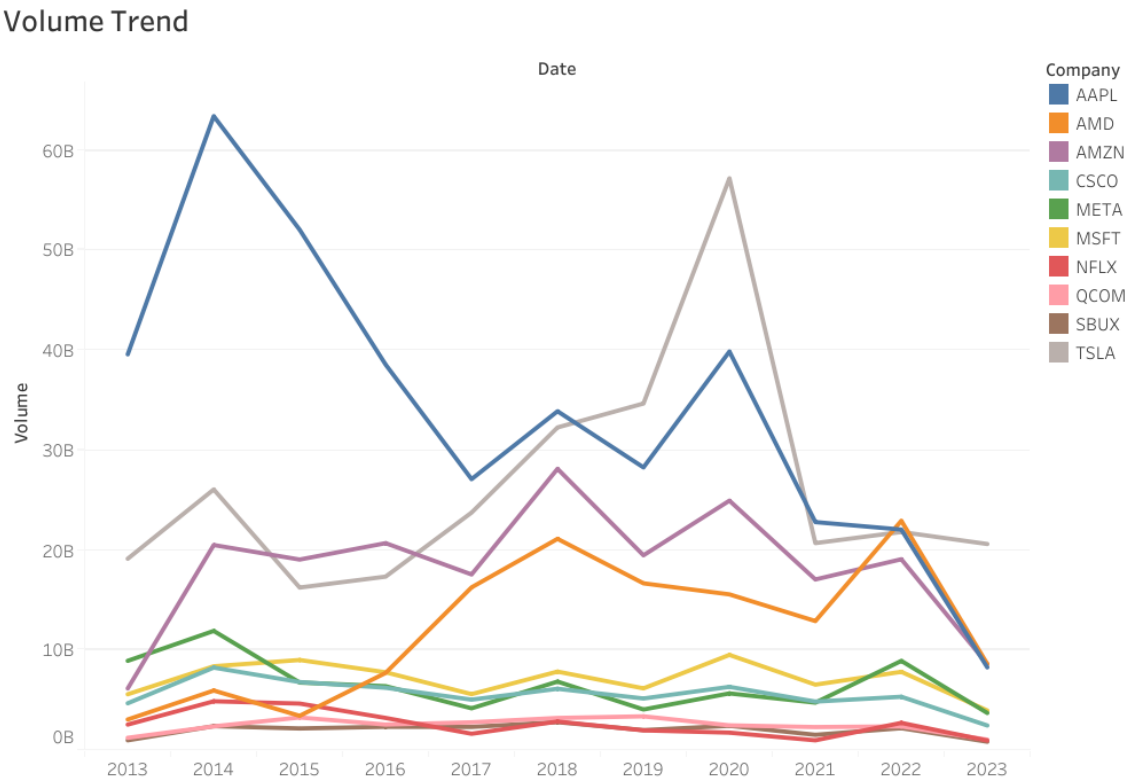
continue focusing on its content offerings, subscriber growth, and technological innovations to maintain this strong position.

Tesla (TSLA): Tesla also has a high stock price, reflecting investors' confidence in the electric vehicle industry. Tesla should focus on expanding its product line, increasing production efficiency, and investing in renewable energy solutions to sustain its growth.

Microsoft (MSFT): Microsoft's high stock price suggests a robust performance and consistent growth. The company should continue innovating in cloud services, software products, and AI technologies to maintain its market leadership.

Meta Platforms (META): Formerly known as Facebook, Meta Platforms has a significant stock price, indicating its importance in the social media and technology sectors. Meta should focus on user engagement, content moderation, and augmented/virtual reality technologies to enhance its platforms' value.

From the output of the stocks volume analysis:



1. Trading Volume Discrepancies: There are significant disparities in trading volumes among the companies. AAPL and TSLA have notably higher trading volumes compared to other companies, indicating higher market activity and investor interest in these stocks.

2. Market Liquidity: Higher trading volumes generally suggest higher liquidity in the market. Stocks with higher liquidity are often preferred by investors as they allow for easier buying and selling without significantly impacting the stock price.
3.Company Popularity: The high trading volumes for AAPL, TSLA, AMZN, and MSFT suggest these companies are popular among investors. Popular companies often attract more attention from analysts, traders, and individual investors, potentially impacting stock prices and market trends.

4.Investor Interest: Stocks with higher trading volumes might attract more attention from both retail and institutional investors. It could indicate market confidence in these companies' future prospects, leading to increased trading activity**.**

5.Market Impact: Higher trading volumes can result in more accurate price discovery and reduced bid-ask spreads, benefiting investors. Additionally, increased trading activity often leads to higher volatility, creating opportunities for traders to profit from short-term price movements.

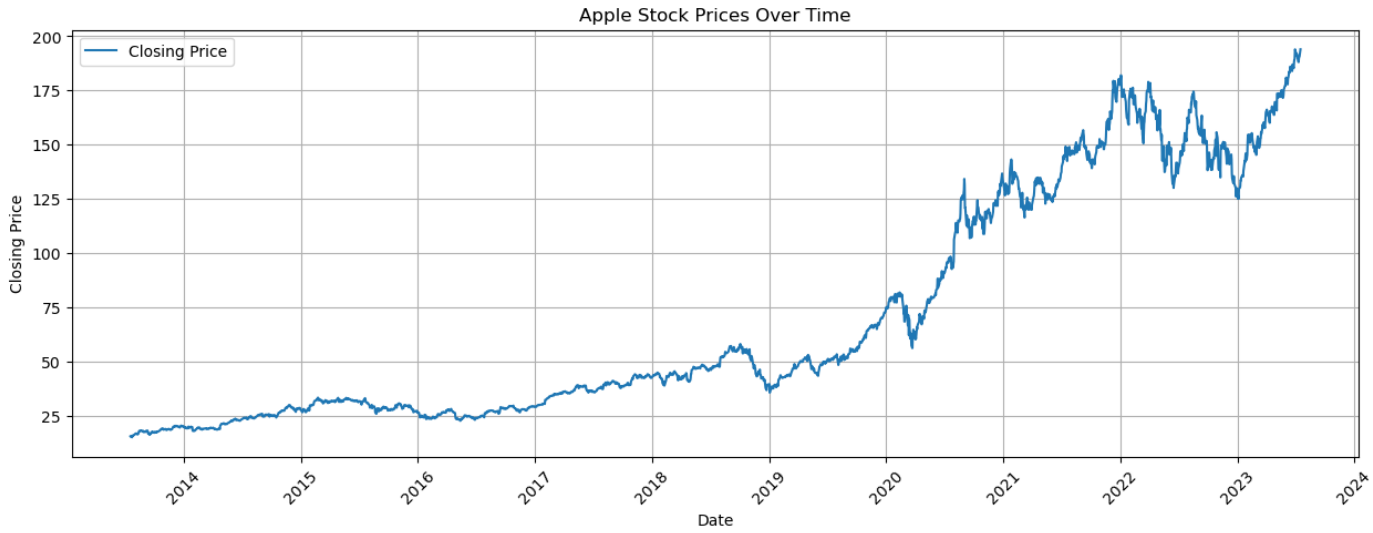
6.Stock Price Stability: Companies with lower trading volumes, such as SBUX and QCOM, might experience higher price volatility due to fewer trades. Investors should be aware of potential price fluctuations when trading less liquid stocks.

7.Investor Behavior: Monitoring changes in trading volumes over time can provide insights into investor sentiment and behavior. Sudden spikes or drops in volume could indicate market events, news releases, or investor reactions to financial results.

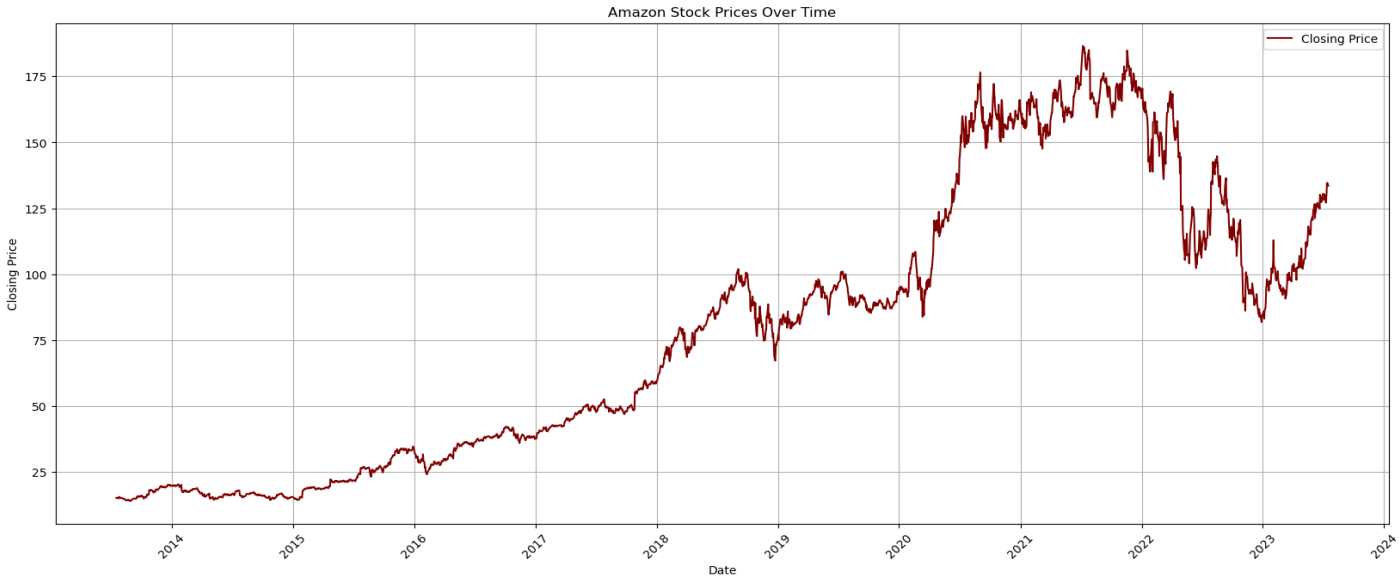
8.Trading Strategies: Investors and traders can use trading volume data to develop strategies. For instance, higher trading volumes often accompany price trends, providing confirmation signals for technical analysis.

9.Liquidity Risk: Stocks with significantly lower trading volumes could pose liquidity risks for investors. It might be challenging to buy or sell large quantities of these stocks without impacting the market price.

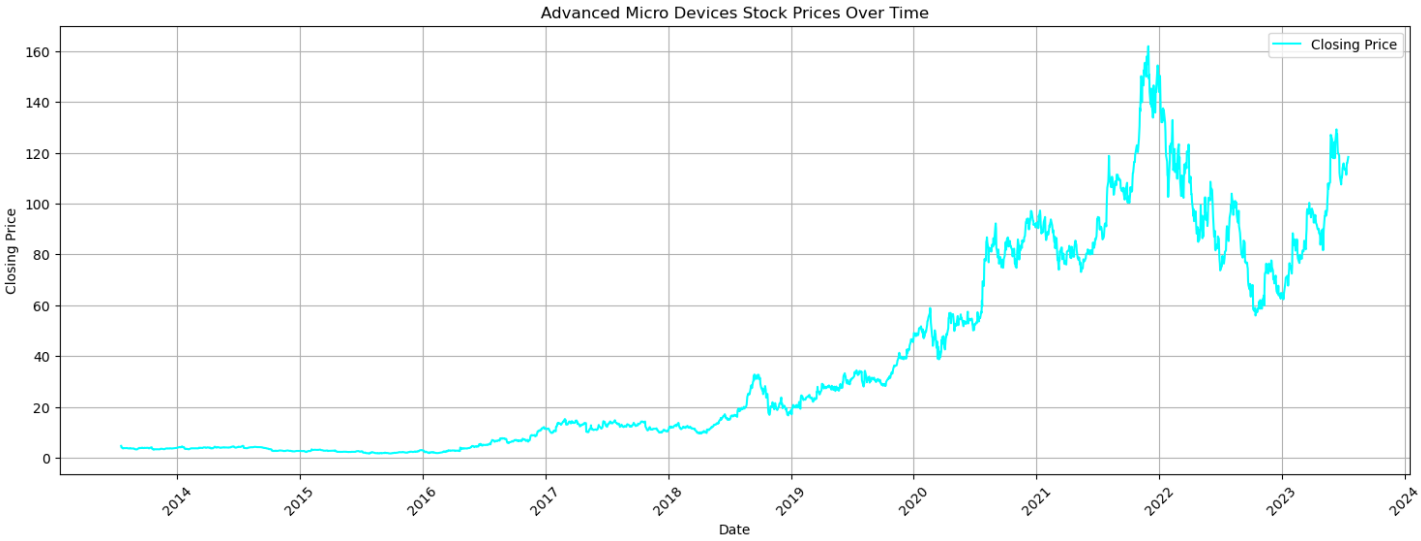
Company	Volume	Open	High	Low
AAPL	1.494464e+08	70.232917	71.020345	69.495501
TSLA	1.152436e+08	83.282714	85.205097	81.263506
AMZN	8.006377e+07	78.857564	79.774733	77.850298
AMD	5.341410e+07	38.067611	38.857642	37.251372
MSFT	3.113659e+07	135.552904	136.923749	134.152655
META	2.871386e+07	165.628444	167.769054	163.575721
CSCO	2.439770e+07	39.076253	39.430352	38.727041
NFLX	1.123296e+07	256.724742	260.699942	252.602322
QCOM	1.075900e+07	86.934609	88.015644	85.851069
SBUX	8.768385e+06	69.949854	70.596494	69.291631



Apple stock prices over time

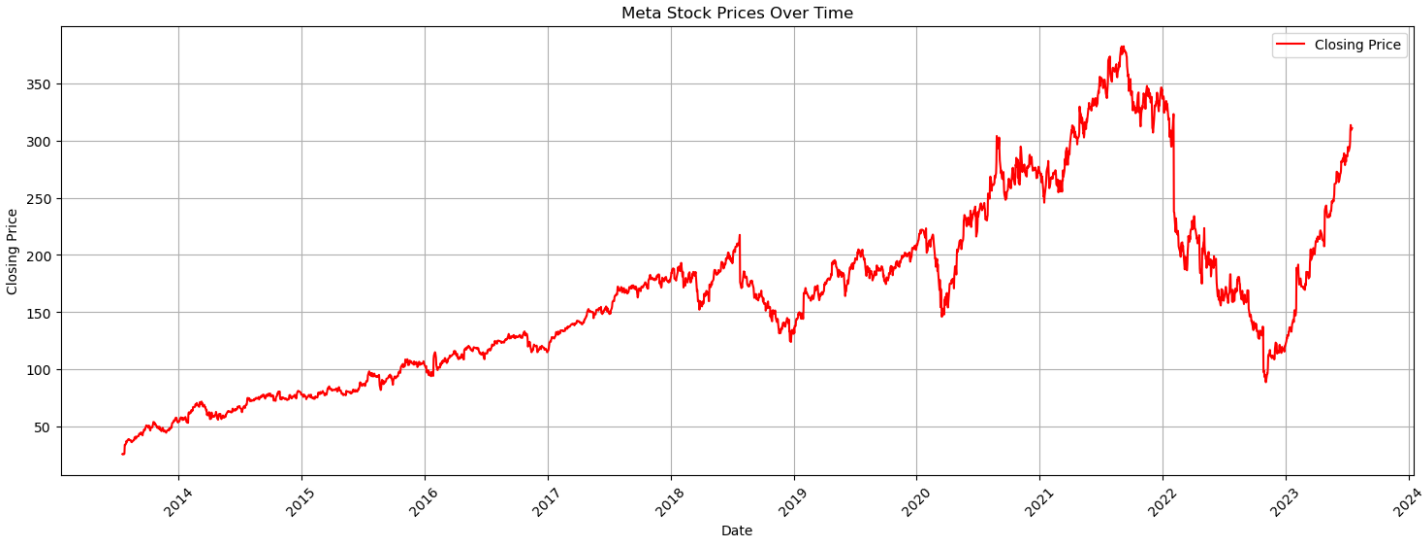


Amazon Stock prices over time

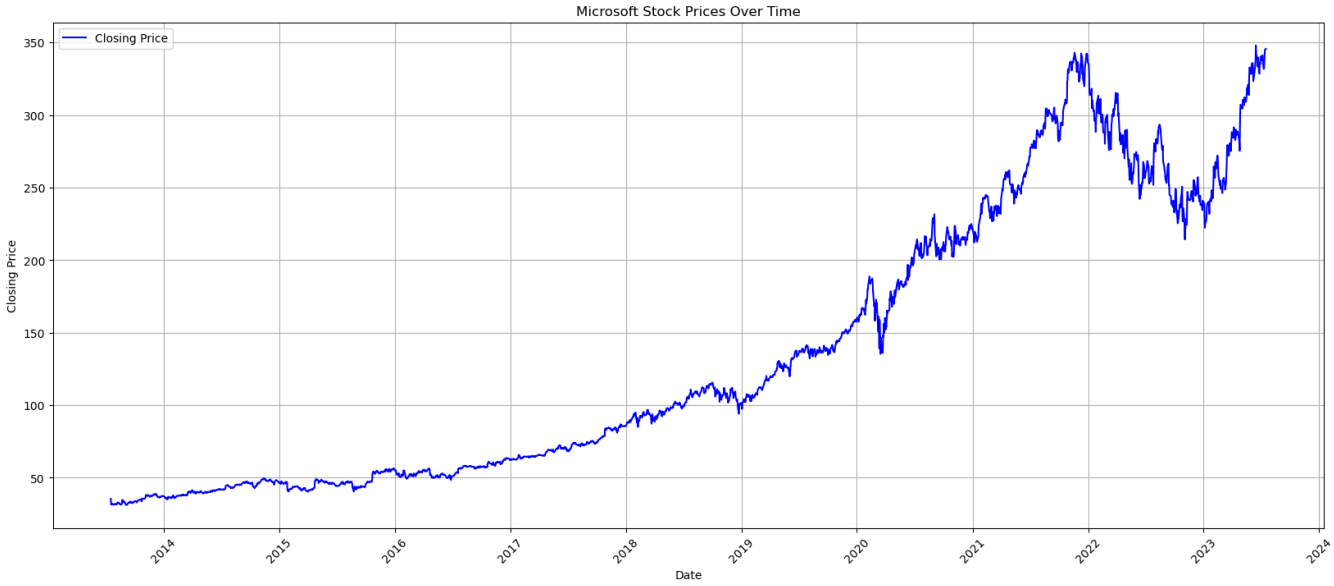


Advanced Micro Devices Prices Over Time

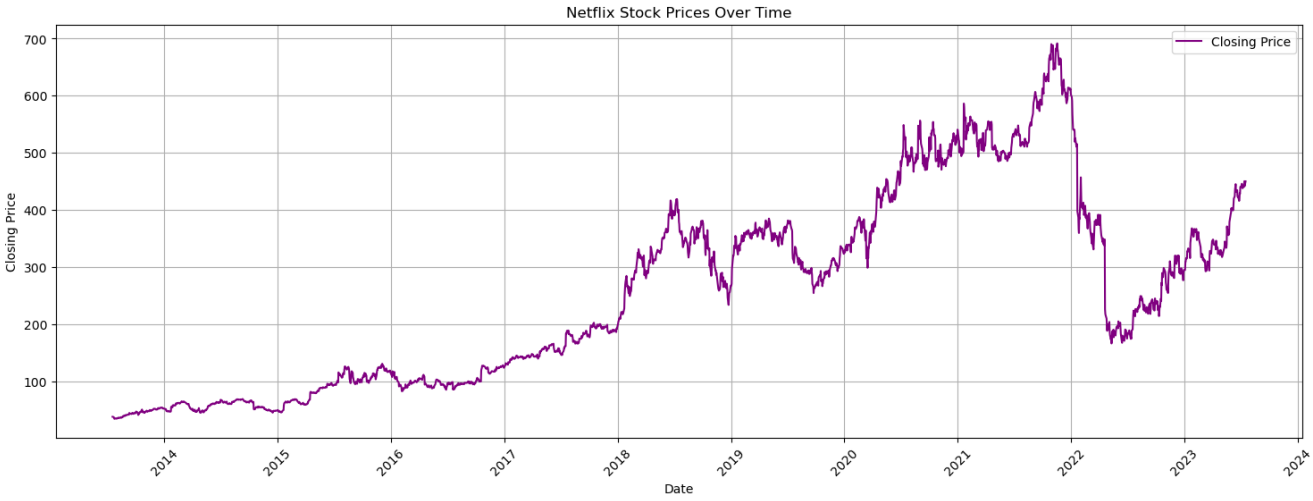
Cisco Systems prices over time



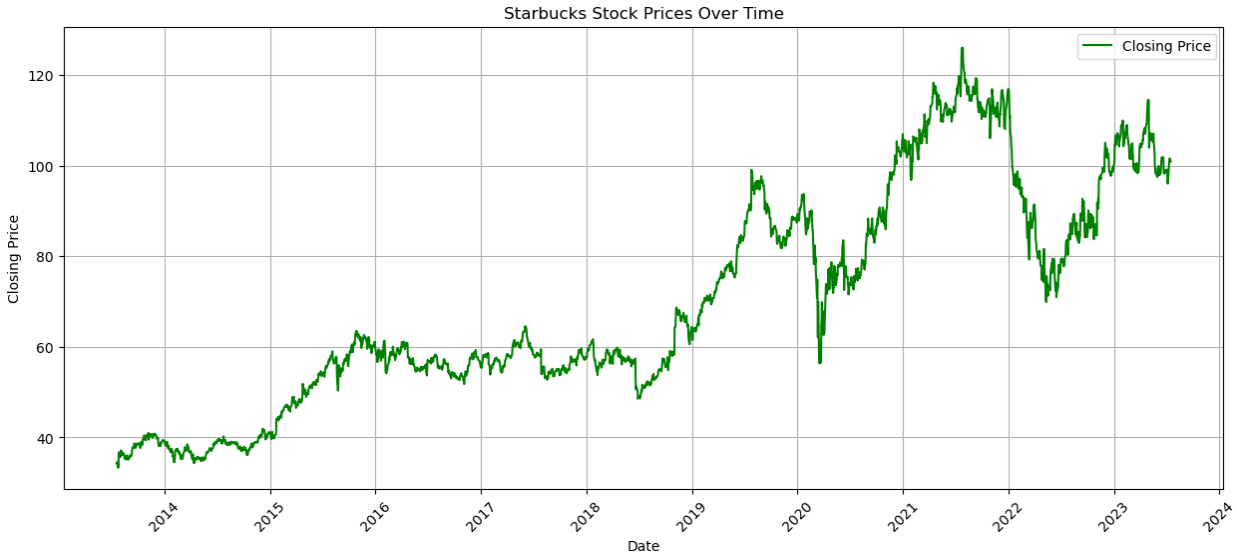
META company stock prices over time



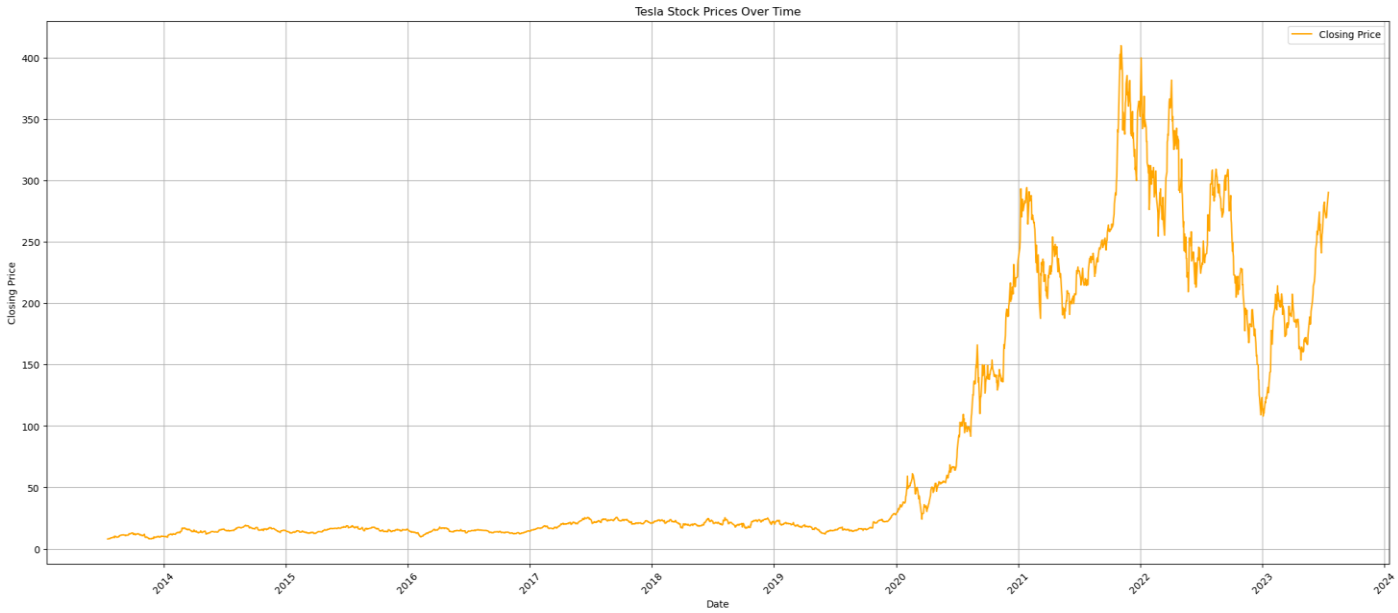
Microsoft Stock prices over time



Netflix stock prices over time



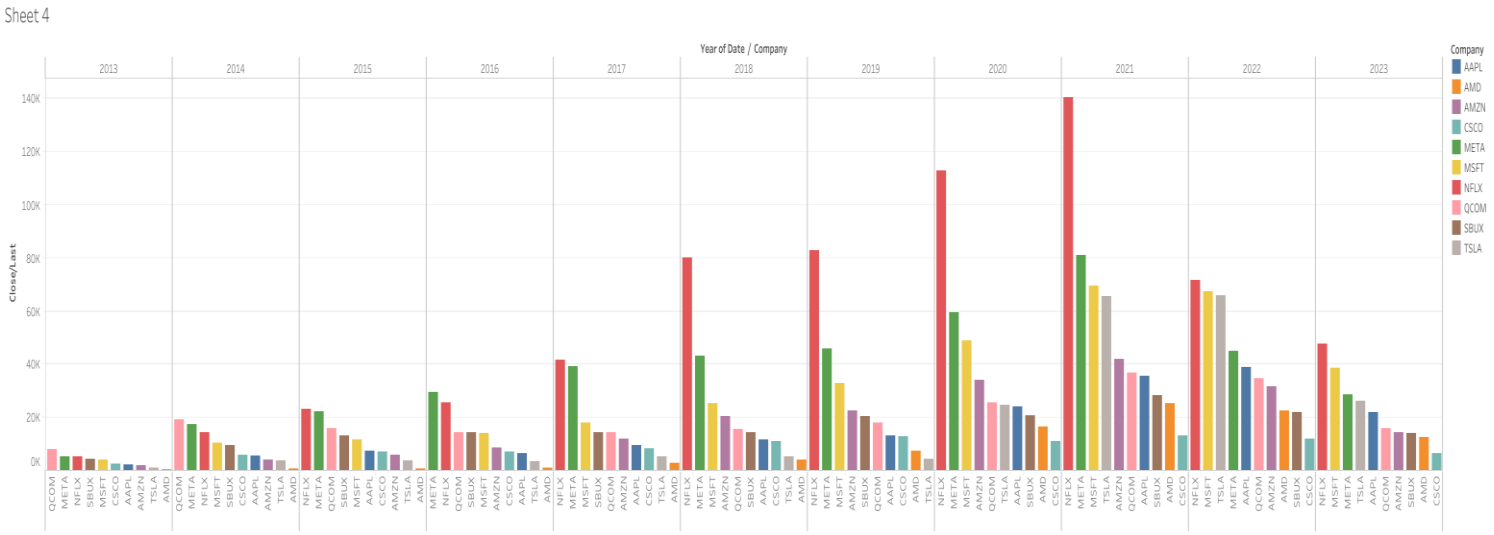
Starbucks stock prices over time



Tesla Stock prices over time

Qualcomm Stock prices over time

Closing/ last price of the traded price of the company's stock by year



- From the year 2013 to2021the closing price or the last traded price of the company's stock has been increased and then it dropped in the year 2022
- The Qualcomm company has the highest closing price in the starting of the decade i.e, in 2013, 2014
  The below might be the reason:
  Shares of Qualcomm (QCOM 1.84%) declined by 32.8% in 2015, according to S&P Capital IQ data. Revenue and profit slumped during the year, driven by a decline in chip sales, and ongoing problems with licensing in China have stunted the company's lucrative licensing business.
- Tesla's impressive growth and ability to overcome challenges in 2021 likely positively influenced investor sentiment, contributing to its rise in the stock market rankings. The electric-car maker managed substantial growth as Europe and China increasingly propelled sales.
  Tesla reported Sunday that it delivered **936,000 cars** in 2021, an **87 percent increase** from the year before, despite the computer chip shortage that has disrupted auto production around the world
  Investors tend to react to such news by adjusting their portfolios, potentially leading to increased demand for the company's stock and impacting its position in the stock market.
- **Netflix had a tough year in 2022**. Big rivals such as Disney and Amazon Prime were circling, and viewers seemed to be rethinking their streaming habits amid rising prices in a turbulent global economy. Netflix lost subscribers, and its share value plummeted.
  This may be reason of sudden decrease in the closing price of the stocks in the year 2022.

- META has maintained its stability from the starting of the decade but then started to decrease its closing price
  Google says that "**Meta lost $13.7 billion on Reality Labs in 2022** as Zuckerberg's metaverse bet gets pricier. Meta's Reality Labs unit recorded a $4.28 billion operating loss in the fourth quarter, bringing its total for 2022 to $13.72 billion." Which might be the biggest reason to their decrease in the last price of the stocks in the year 2022.

Suggestions:

Diversification: Investors should consider diversifying their portfolio across multiple sectors and industries to spread the risk. Holding a mix of stocks from different sectors can help mitigate losses if one sector experiences a downturn.

Long-Term Perspective: Consider the investment horizon and align investments with long-term financial goals. Short-term price fluctuations are common, but a long-term perspective can help investors ride out market volatility and benefit from the overall growth of the market.

MY DASHBOARD: