Stock Price Movement

Plot and analyze short-term stock price movement and identify treds.

Name: Aditya Kumar

Branch: CSE AIML

University roll no.: 202401100400015

Introduction

Stock price movement analysis is crucial for investors, traders, and financial analysts. Stock prices fluctuate due to multiple factors, such as economic conditions, investor sentiment, and market news. Analyzing these price movements helps in understanding market trends and making informed investment decisions.

This project aims to analyze short-term stock price movements using historical stock data. The study involves fetching stock data, visualizing price movements, applying trend analysis techniques, and using moving averages to identify trends.

Methodology

Approach Used to Solve the Problem

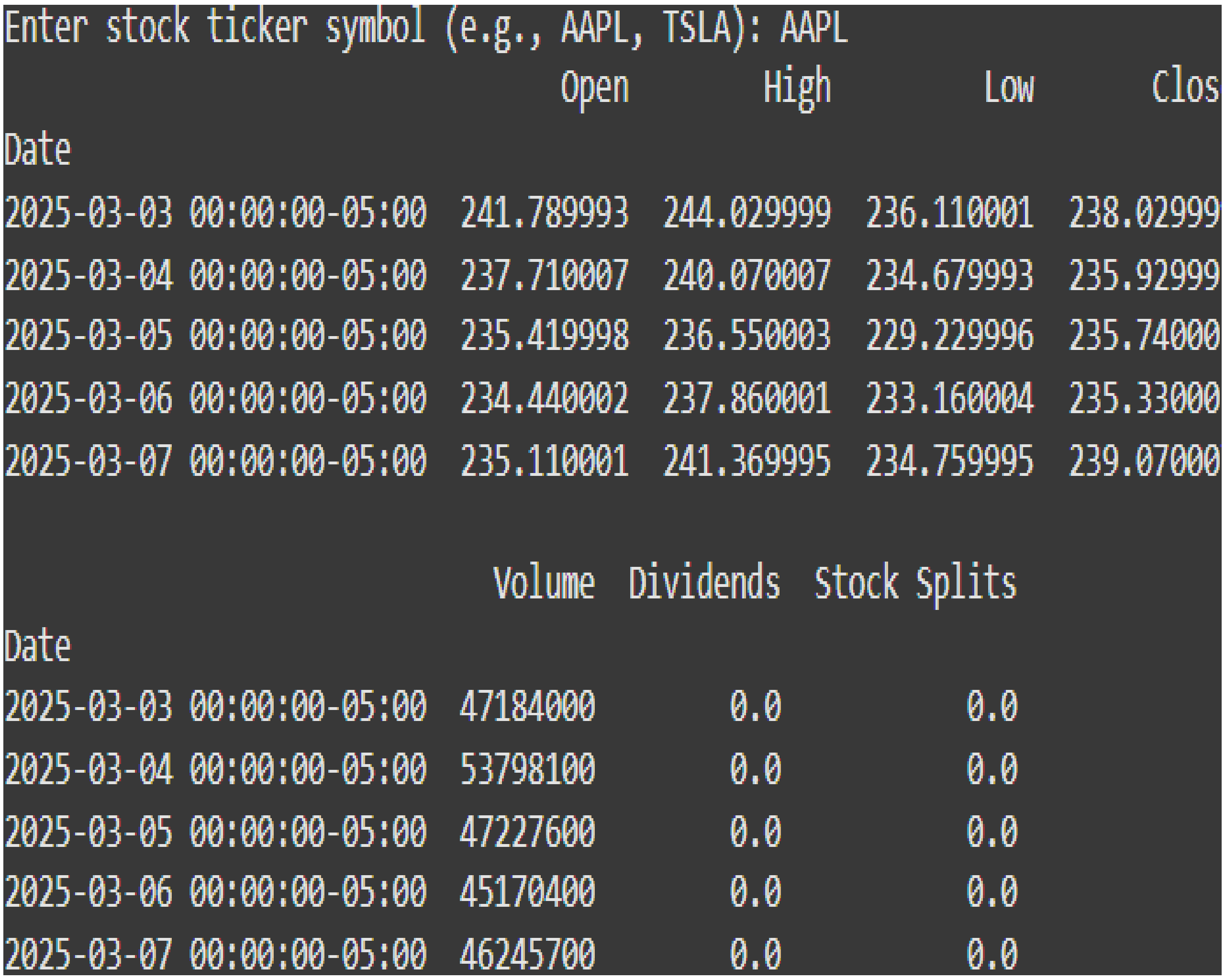
1. **Data Collection:**
   - Stock price data is retrieved using the Yahoo Finance API (yfinance library).
   - Historical stock prices for a chosen stock ticker are fetched for a short-term period (1 month).
2. **Data Preprocessing:**
   - The dataset is checked for missing values.
   - Dates are formatted to ensure proper visualization.
3. **Trend Identification:**
   - Short-term (5-day) and long-term (20-day) moving averages are calculated.
   - A crossover strategy is used to determine potential buy and sell signals.
4. **Visualization:**
   - Stock price movement is plotted using Matplotlib and Seaborn.
   - Moving averages are visualized to identify trends.

CODE

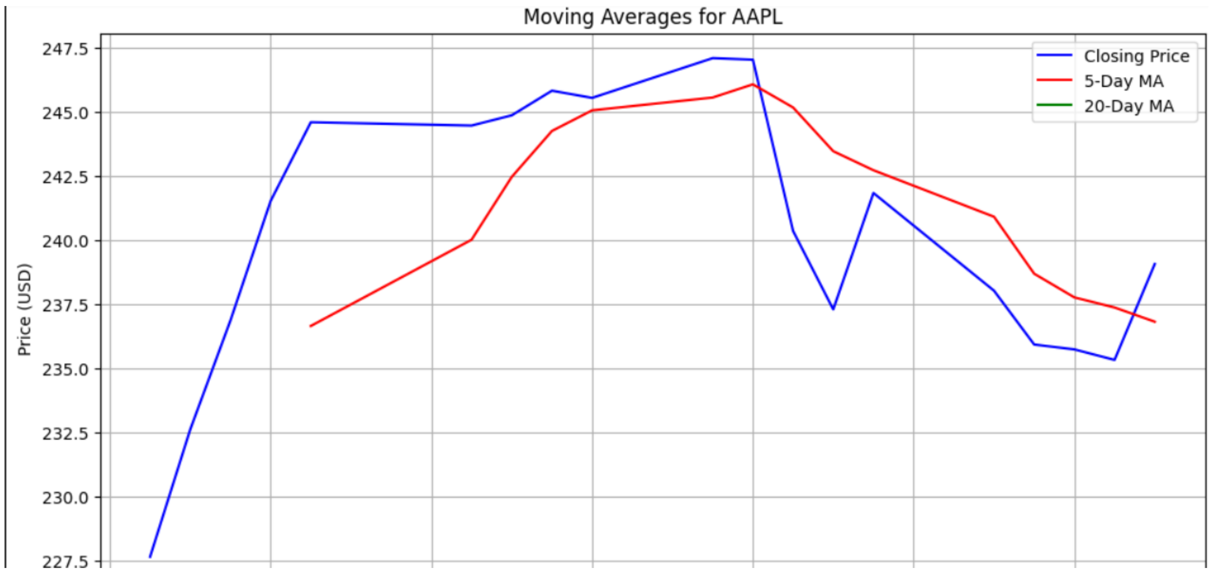
```
import yfinance as yf  # Import Yahoo Finance library to fetch stock data
import pandas as pd  # Import Pandas for data manipulation
import matplotlib.pyplot as plt  # Import Matplotlib for plotting
import seaborn as sns  # Import Seaborn for improved visualization

# Function to fetch stock data
def get_stock_data(ticker, period='1mo', interval='1d'):
    stock = yf.Ticker(ticker)  # Create a stock object using the ticker symbol
    data = stock.history(period=period, interval=interval)  # Fetch historical stock data
    return data  # Return the data as a DataFrame

# Function to plot stock price movement
def plot_stock_movement(data, ticker):
    plt.figure(figsize=(12, 6))  # Set figure size
    sns.lineplot(data=data, x=data.index, y='Close', label='Closing Price')  # Plot closing price
    plt.title(f'Stock Price Movement of {ticker}')  # Set title
    plt.xlabel('Date')  # Label for x-axis
    plt.ylabel('Closing Price (USD)')  # Label for y-axis
    plt.grid(True)  # Enable grid for better readability
    plt.legend()  # Display legend
    plt.show()  # Show the plot

# Function to calculate and plot moving averages
def plot_moving_averages(data, ticker, short_window=5,
long_window=20):
    data['Short MA'] =
data['Close'].rolling(window=short_window).mean()  # Calculate
short-term moving average
    data['Long MA'] =
data['Close'].rolling(window=long_window).mean()  # Calculate long-
term moving average

    plt.figure(figsize=(12, 6))  # Set figure size
    plt.plot(data.index, data['Close'], label='Closing Price', color='blue')
# Plot closing price
    plt.plot(data.index, data['Short MA'], label=f'{short_window}-Day
MA', color='red')  # Plot short MA
    plt.plot(data.index, data['Long MA'], label=f'{long_window}-Day
MA', color='green')  # Plot long MA
    plt.title(f'Moving Averages for {ticker}')  # Set title
    plt.xlabel('Date')  # Label for x-axis
    plt.ylabel('Price (USD)')  # Label for y-axis
    plt.legend()  # Display legend
    plt.grid(True)  # Enable grid for readability
    plt.show()  # Show the plot

# Main function to fetch data and plot trends
def main():
    ticker = input("Enter stock ticker symbol (e.g., AAPL, TSLA): 
").upper()  # Get stock symbol from user
    period = '1mo'  # Define the period to fetch data (1 month)
    interval = '1d'  # Define the interval (daily data)

    stock_data = get_stock_data(ticker, period, interval)  # Fetch stock 
data
    if stock_data.empty:
        print("Invalid ticker symbol or no data available.")  # Check for 
empty data
        return

    print(stock_data.tail())  # Display the last few rows of stock data
    plot_stock_movement(stock_data, ticker)  # Plot stock price 
movement
    plot_moving_averages(stock_data, ticker)  # Plot moving averages

# Run the script if executed in Google Colab
if __name__ == "__main__":
```

```
main()  # Call the main function to execute the script
```

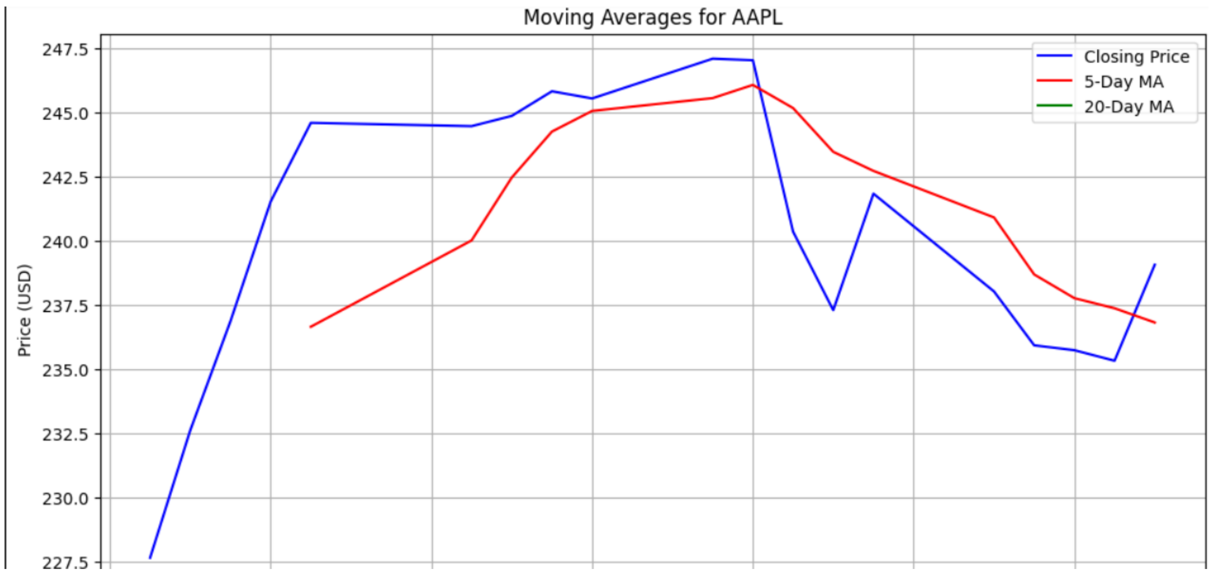
OUTPUT



```
Enter stock ticker symbol (e.g., AAPL, TSLA): AAPL
                                 Open        High         Low       Clos
Date
2025-03-03 00:00:00-05:00  241.789993  244.029999  236.110001  238.02999
2025-03-04 00:00:00-05:00  237.710007  240.070007  234.679993  235.92999
2025-03-05 00:00:00-05:00  235.419998  236.550003  229.229996  235.74000
2025-03-06 00:00:00-05:00  234.440002  237.860001  233.160004  235.33000
2025-03-07 00:00:00-05:00  235.110001  241.369995  234.759995  239.07000

                             Volume  Dividends  Stock Splits
Date
2025-03-03 00:00:00-05:00  47184000        0.0           0.0
2025-03-04 00:00:00-05:00  53798100        0.0           0.0
2025-03-05 00:00:00-05:00  47227600        0.0           0.0
2025-03-06 00:00:00-05:00  45170400        0.0           0.0
2025-03-07 00:00:00-05:00  46245700        0.0           0.0
```



Moving Averages for AAPL
Price (USD)
247.5
245.0
242.5
240.0
237.5
235.0
232.5
230.0
227.5
Closing Price
5-Day MA
20-Day MA



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227.5
Closing Price
5-Day MA
20-Day MA

REFRENCES

- Yahoo Finance API Documentation: https://pypi.org/project/yfinance/
- Pandas Documentation: https://pandas.pydata.org/docs/
- Matplotlib Documentation: https://matplotlib.org/stable/contents.html
- Seaborn Documentation: https://seaborn.pydata.org/