In [1]:
```
pip install yfinance pandas matplotlib
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: yfinance in c:\users\purnangshu roy\appdata\roaming
\python\python311\site-packages (0.2.40)
Requirement already satisfied: pandas in c:\programdata\anaconda3\lib\site-package
s (1.5.3)
Requirement already satisfied: matplotlib in c:\programdata\anaconda3\lib\site-pac
kages (3.7.1)
Requirement already satisfied: numpy>=1.16.5 in c:\programdata\anaconda3\lib\site-
packages (from yfinance) (1.24.3)
Requirement already satisfied: requests>=2.31 in c:\users\purnangshu roy\appdata\r
oaming\python\python311\site-packages (from yfinance) (2.32.3)
Requirement already satisfied: multitasking>=0.0.7 in c:\users\purnangshu roy\appd
ata\roaming\python\python311\site-packages (from yfinance) (0.0.11)
Requirement already satisfied: lxml>=4.9.1 in c:\programdata\anaconda3\lib\site-pa
ckages (from yfinance) (4.9.2)
Requirement already satisfied: platformdirs>=2.0.0 in c:\users\purnangshu roy\appd
ata\roaming\python\python311\site-packages (from yfinance) (4.2.0)
Requirement already satisfied: pytz>=2022.5 in c:\programdata\anaconda3\lib\site-p
ackages (from yfinance) (2022.7)
Requirement already satisfied: frozendict>=2.3.4 in c:\users\purnangshu roy\appdat
a\roaming\python\python311\site-packages (from yfinance) (2.4.4)
Requirement already satisfied: peewee>=3.16.2 in c:\users\purnangshu roy\appdata\r
oaming\python\python311\site-packages (from yfinance) (3.17.6)
Requirement already satisfied: beautifulsoup4>=4.11.1 in c:\programdata\anaconda3
\lib\site-packages (from yfinance) (4.12.2)
Requirement already satisfied: html5lib>=1.1 in c:\users\purnangshu roy\appdata\ro
aming\python\python311\site-packages (from yfinance) (1.1)
Requirement already satisfied: python-dateutil>=2.8.1 in c:\programdata\anaconda3
\lib\site-packages (from pandas) (2.8.2)
Requirement already satisfied: contourpy>=1.0.1 in c:\programdata\anaconda3\lib\si
te-packages (from matplotlib) (1.0.5)
Requirement already satisfied: cycler>=0.10 in c:\programdata\anaconda3\lib\site-p
ackages (from matplotlib) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\programdata\anaconda3\lib\s
ite-packages (from matplotlib) (4.25.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\programdata\anaconda3\lib\s
ite-packages (from matplotlib) (1.4.4)
Requirement already satisfied: packaging>=20.0 in c:\users\purnangshu roy\appdata
\roaming\python\python311\site-packages (from matplotlib) (24.0)
Requirement already satisfied: pillow>=6.2.0 in c:\programdata\anaconda3\lib\site-
packages (from matplotlib) (9.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\programdata\anaconda3\lib\si
te-packages (from matplotlib) (3.0.9)
Requirement already satisfied: soupsieve>1.2 in c:\programdata\anaconda3\lib\site-
packages (from beautifulsoup4>=4.11.1->yfinance) (2.4)
Requirement already satisfied: six>=1.9 in c:\programdata\anaconda3\lib\site-packa
ges (from html5lib>=1.1->yfinance) (1.16.0)
Requirement already satisfied: webencodings in c:\programdata\anaconda3\lib\site-p
ackages (from html5lib>=1.1->yfinance) (0.5.1)
Requirement already satisfied: charset-normalizer<4,>=2 in c:\programdata\anaconda
3\lib\site-packages (from requests>=2.31->yfinance) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\programdata\anaconda3\lib\site-p
ackages (from requests>=2.31->yfinance) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\programdata\anaconda3\lib
\site-packages (from requests>=2.31->yfinance) (1.26.16)
Requirement already satisfied: certifi>=2017.4.17 in c:\programdata\anaconda3\lib
\site-packages (from requests>=2.31->yfinance) (2023.7.22)
Note: you may need to restart the kernel to use updated packages.
```

In [2]:
```
import pandas as pd
import yfinance as yf
import matplotlib.pyplot as plt

# Define the mutual fund tickers and their respective weights
tickers = ['AAPL', 'GOOGL', 'AMZN', 'MSFT']
weights = [0.3, 0.2, 0.2, 0.3]

# Download the historical data for each ticker
data = {}
for ticker in tickers:
    data[ticker] = yf.download(ticker, start='2015-01-01', end='2022-02-26')['Adj C

# Create a portfolio dataframe with the weighted returns
portfolio = pd.DataFrame(index=data['AAPL'].index)
for ticker, weight in zip(tickers, weights):
    portfolio[ticker] = data[ticker] * weight
    portfolio['Portfolio'] = portfolio.sum(axis=1)

# Calculate the daily returns of the portfolio
portfolio_returns = portfolio['Portfolio'].pct_change()

# Plot the portfolio returns
plt.plot(portfolio_returns)
plt.xlabel('Date')
plt.ylabel('Returns')
plt.title('Portfolio Returns')
plt.show()

# Calculate the moving average (MA) of the portfolio returns
ma_window = 20
portfolio_ma = portfolio_returns.rolling(window=ma_window).mean()

# Plot the MA of the portfolio returns
plt.plot(portfolio_ma)
plt.xlabel('Date')
plt.ylabel('MA Returns')
plt.title('Moving Average of Portfolio Returns')
plt.show()

# Calculate the relative strength index (RSI) of the portfolio returns
rsi_window = 14
rsi = portfolio_returns.rolling(window=rsi_window).std() / (portfolio_returns.rolli

# Plot the RSI of the portfolio returns
plt.plot(rsi)
plt.xlabel('Date')
plt.ylabel('RSI')
plt.title('Relative Strength Index of Portfolio Returns')
plt.show()

# Perform trend analysis using the MACD and RSI indicators
macd_signal = ma_window - 2
macd_histogram = (portfolio_ma - macd_signal) * 2

# Plot the MACD and RSI indicators
plt.plot(portfolio_ma)
plt.plot(macd_signal)
plt.fill_between(portfolio_ma.index, macd_histogram, where=(macd_histogram > 0), co
plt.fill_between(portfolio_ma.index, macd_histogram, where=(macd_histogram < 0), co
plt.xlabel('Date')
plt.ylabel('MACD')
```

```
plt.title('Trend Analysis using MACD and RSI')
plt.show()
```

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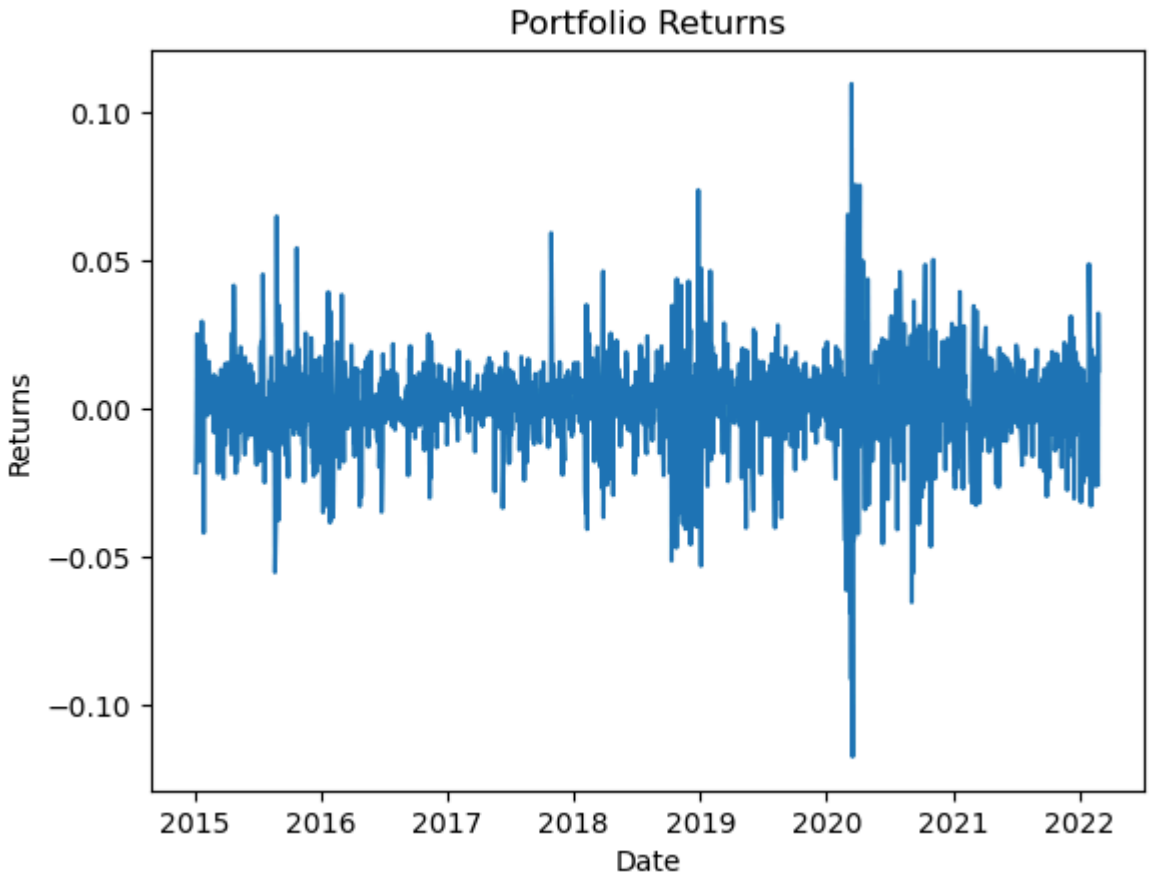
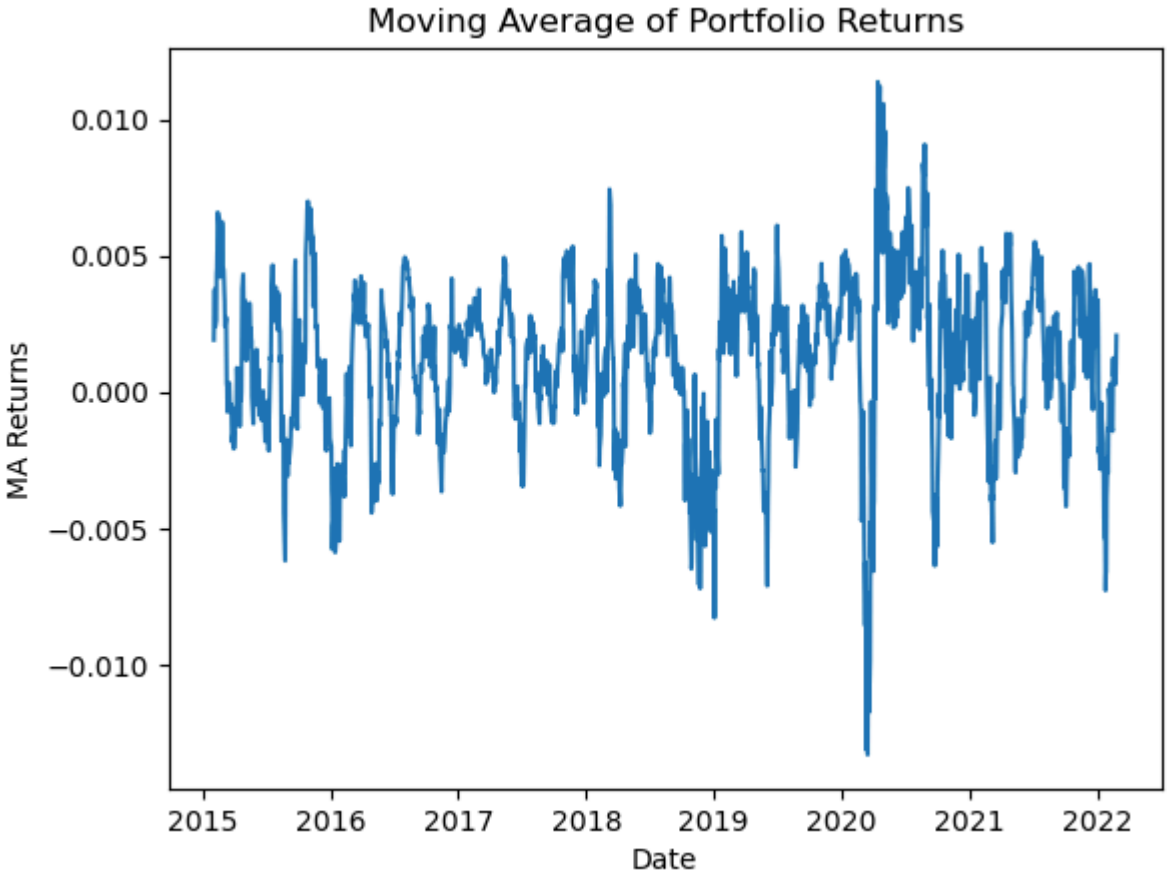
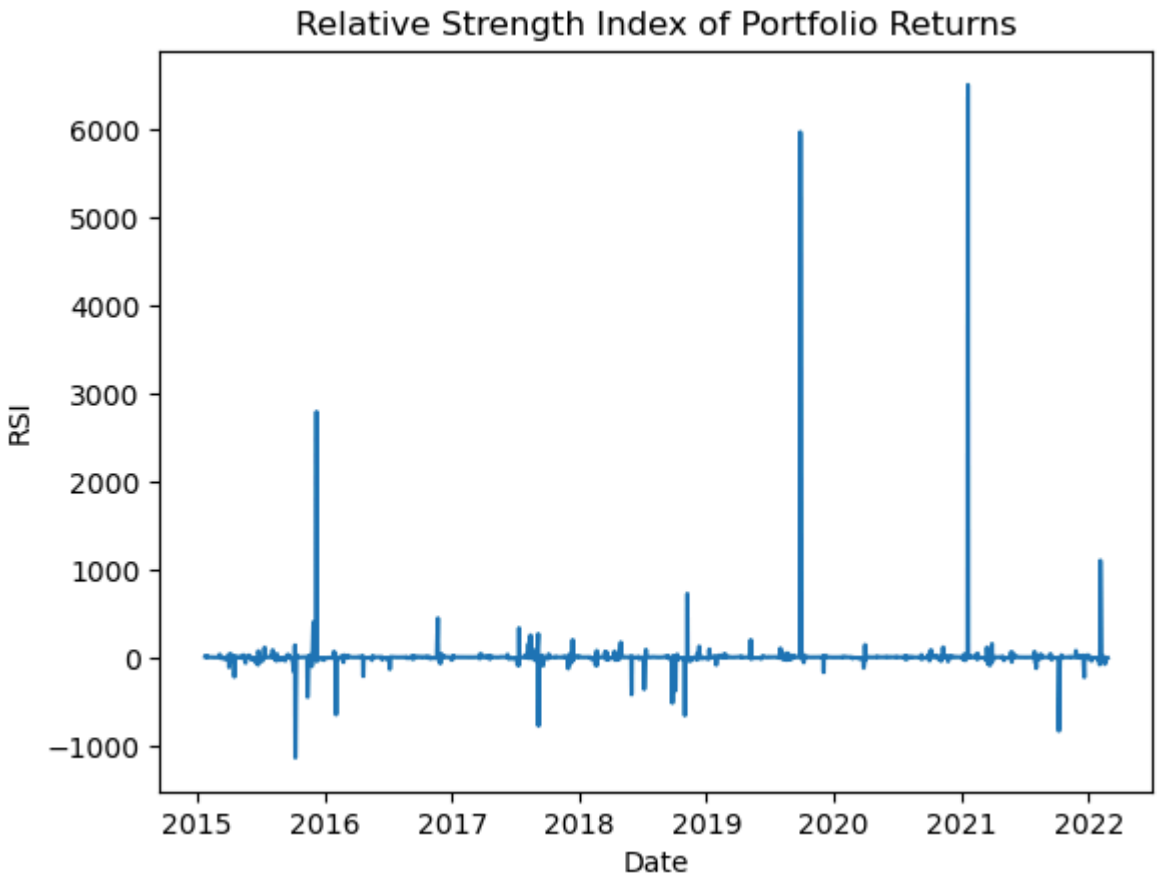
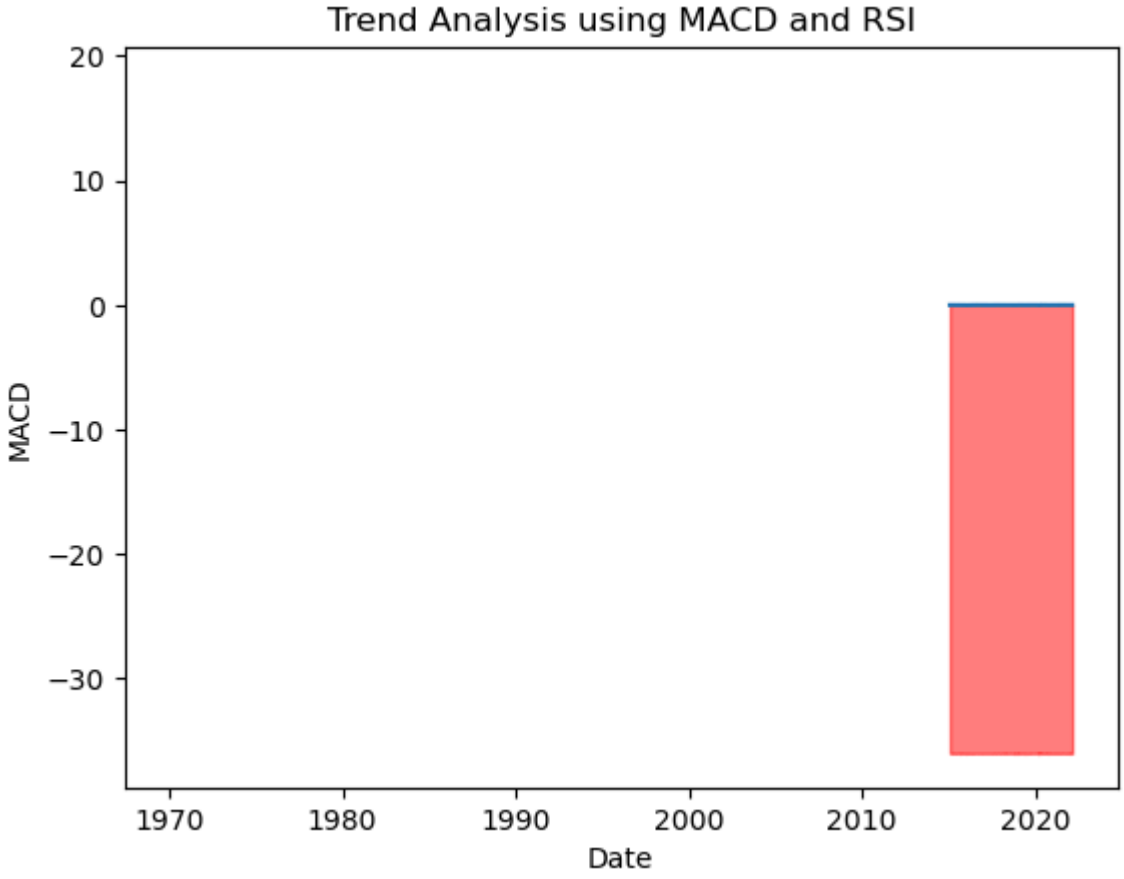
[**********100%%**********]  1 of 1 completed
[**********100%%**********]  1 of 1 completed
[**********100%%**********]  1 of 1 completed
```






Relative Strength Index of Portfolio Returns
RSI
6000
5000
4000
3000
2000
1000
0
−1000
2015
2016
2017
2018
2019
2020
2021
2022
Date


Trend Analysis using MACD and RSI
MACD
20
10
0
−10
−20
−30
1970
1980
1990
2000
2010
2020
Date

In [ ]: