Assignment 6

```
In [1]: import pandas as pd
        import seaborn as sns
        import matplotlib.pyplot as plt
        from tiingo import TiingoClient
        import numpy as np
        from datetime import date
        import warnings
        warnings.filterwarnings('ignore')
        from dateutil.relativedelta import relativedelta
        config = {}

        config['session'] = True

        config['api_key'] = "110ee73e29ec4269f49eb85cfb4b976ab8e73361"

        client = TiingoClient(config)
```

```
In [3]: def download_financial_data(ticker):
            fin_data = client.get_ticker_price(ticker,
                                               fmt='csv',
                                               startDate = date.today() - relativedelta(years=5),
                                               endDate = date.today(),
                                               frequency = 'daily')
            file_name = f"{ticker}.csv"
            with open(file_name,'w') as outfile:
                outfile.write(fin_data)
            print(f'{ticker}.csv created')
            return pd.read_csv(f"{ticker}.csv")
```

```
In [7]: gold_df = pd.read_csv("Gold_data.csv")
        btc_df = download_financial_data('btcusd')
```

```
btcusd.csv created
```

```
In [5]: gold_df.head()
```

Out[5]:

	Date	Close/Last	Volume	Open	High	Low
0	5/27/2022	1857.3	119997.0	1855.1	1866.9	1851.9
1	5/26/2022	1853.9	88345.0	1857.9	1859.0	1842.5
2	5/25/2022	1852.5	95996.0	1871.2	1872.7	1845.0
3	5/24/2022	1871.4	69225.0	1858.6	1875.0	1853.9
4	5/23/2022	1853.9	57586.0	1850.9	1870.4	1849.7

```
In [38]: btc_df['date'] = pd.to_datetime(btc_df['date'])
         gold_df['date'] = pd.to_datetime(gold_df['date'])
         btc_df.sort_values(by = 'date',ascending = False).head()
```

Out[38]:

	date	btc_close	high	low	open	volume	adjClose	adjHigh	adjLow	adjOpen	
1826	2022-05-29	28868.873786	29018.854383	28811.441540	29006.567725	3521.695841	28868.873786	29018.854383	28811.441540	29006.567725	3
1825	2022-05-28	29006.626425	29237.776031	28429.948720	28599.069690	34952.691979	29006.626425	29237.776031	28429.948720	28599.069690	34
1824	2022-05-27	28593.926055	29365.021267	28250.387533	29257.723371	54207.435320	28593.926055	29365.021267	28250.387533	29257.723371	54
1823	2022-05-26	29258.072989	29874.255055	28090.363444	29530.370750	53314.779656	29258.072989	29874.255055	28090.363444	29530.370750	53
1822	2022-05-25	29532.119065	30215.489191	29296.848344	29645.002294	51161.106553	29532.119065	30215.489191	29296.848344	29645.002294	51

```
In [18]: gold_df['returns'] = gold_df['Close/Last'].pct_change(1)
         btc_df['returns'] = btc_df['close'].pct_change(1)
```

```
In [34]: gold_df = gold_df.rename(columns = {"Close/Last" : "gold_close"})
         btc_df = btc_df.rename(columns = {"close" : "btc_close"})
```

```
In [35]: gold_df = gold_df.rename(columns = {"Date" : "date"})
         gold_df.head()
```

Out[35]:

	date	gold_close	Volume	Open	High	Low	returns
0	5/27/2022	1857.3	119997.0	1855.1	1866.9	1851.9	NaN
1	5/26/2022	1853.9	88345.0	1857.9	1859.0	1842.5	-0.001831
2	5/25/2022	1852.5	95996.0	1871.2	1872.7	1845.0	-0.000755
3	5/24/2022	1871.4	69225.0	1858.6	1875.0	1853.9	0.010202
4	5/23/2022	1853.9	57586.0	1850.9	1870.4	1849.7	-0.009351

```
In [39]: df = gold_df.merge(btc_df,on="date",how="left")
         df.dropna(inplace=True)
         df.head()
```

Out[39]:

	date	gold_close	Volume	Open	High	Low	returns_x	btc_close	high	low	open	volume	adj
1	2022-05-26	1853.9	88345.0	1857.9	1859.0	1842.5	-0.001831	29258.072989	29874.255055	28090.363444	29530.370750	53314.779656	29258.07
2	2022-05-25	1852.5	95996.0	1871.2	1872.7	1845.0	-0.000755	29532.119065	30215.489191	29296.848344	29645.002294	51161.106553	29532.1
3	2022-05-24	1871.4	69225.0	1858.6	1875.0	1853.9	0.010202	29649.567729	29816.472086	28675.169540	29102.269330	51601.374198	29649.5
4	2022-05-23	1853.9	57586.0	1850.9	1870.4	1849.7	-0.009351	29099.315853	30645.789611	28902.064158	30280.792476	47366.035102	29099.3
5	2022-05-20	1848.4	40522.0	1847.4	1854.0	1837.3	-0.002967	29183.305230	30701.953764	28714.536819	30305.197864	51032.611873	29183.30

```
In [21]: f = sns.distplot(gold_df['returns']).set_title('Gold Return Distribution')
         plt.figure()
         g = sns.distplot(btc_df['returns']).set_title('Bitchoin Return Distribution')
         plt.figure()
```

Out[21]: `<Figure size 432x288 with 0 Axes>`


```
<Figure size 432x288 with 0 Axes>
```
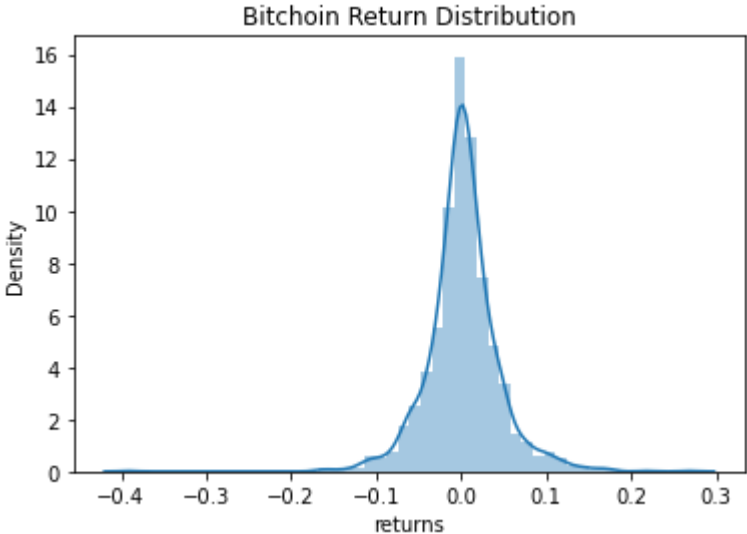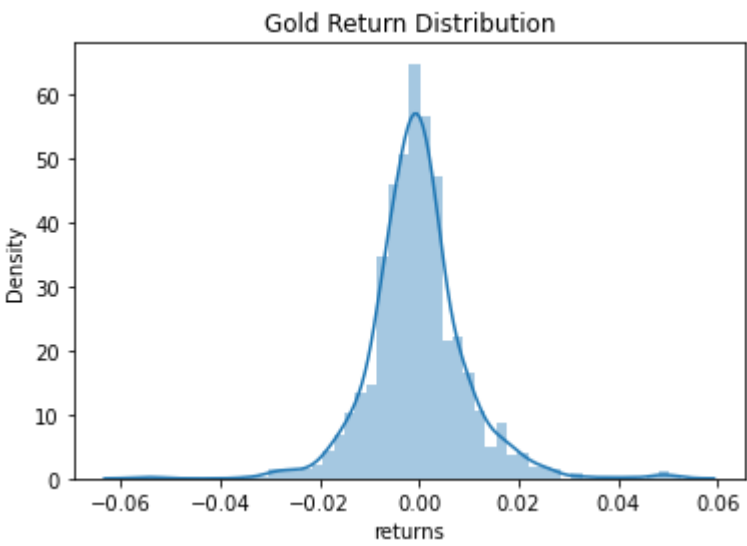
```
In [42]: ax = df.plot(x="date", y="btc_close", legend=False)
         ax2 = ax.twinx()
         df.plot(x="date", y="gold_close", ax=ax2, legend=False, color="r")
         ax.figure.legend()
         ax.set_ylabel("BTC")
         ax2.set_ylabel("Gold")
         plt.show()
```



```
In [45]: print(f"Correlation between Gold and BTC: {round(df['btc_close'].corr(df['gold_close']) * 100,2)}%")
```

```
Correlation between Gold and BTC: 67.57%
```