CAPSTONE : FINANCE AND RISK ANALYTICS (PORTFOLIO MANAGEMENT)

BY: DEVARAJAN NARAYANAN

Agenda

➢Objective

➢Background

➢Factor

➢Portfolio

➢Recommendation

Objective

➢ Creating a Portfolio for the Investor (Ms Alexandra Kolishnyick (aka Alexa)).

➢ Analyising the different sectors with comparision to Index and investor's mentality to create suitable portfolio.

➢ Suggesting better Portfolio to invest

Background

➢ Ms Alexandra Kolishnyick (aka Alexa) is a daughter of famous Ukrainian Business tycoon. Reserved & conservative person

➢ Had a future goals to form an NGO later finishing her bachelor degree. Her family and friends supporting her decision

➢ Alexa holding a huge savings from daily expense money provided by her parents

➢ Refuse to take help from parents to establish the NGO

➢ Want to invest the saved money during her college to use matured amount for NGO

➢ Interested to invest in stocks which shows promise and stable

Factor: Stock With Volume Analysis
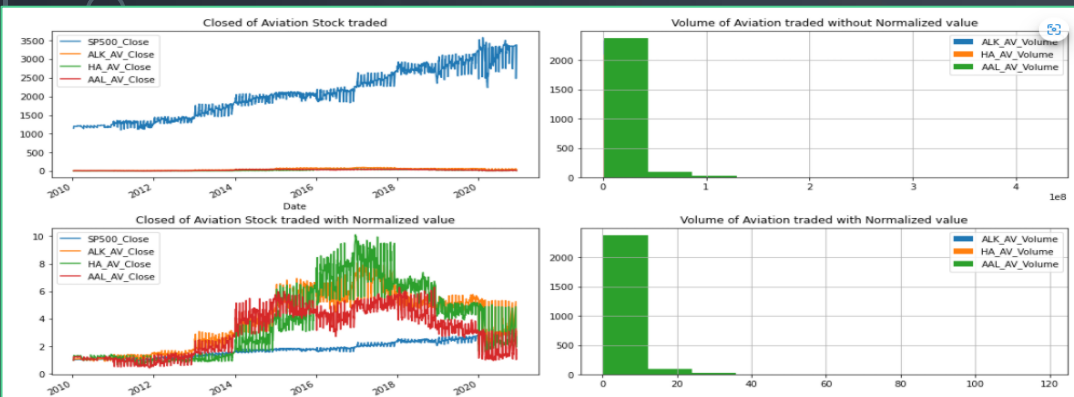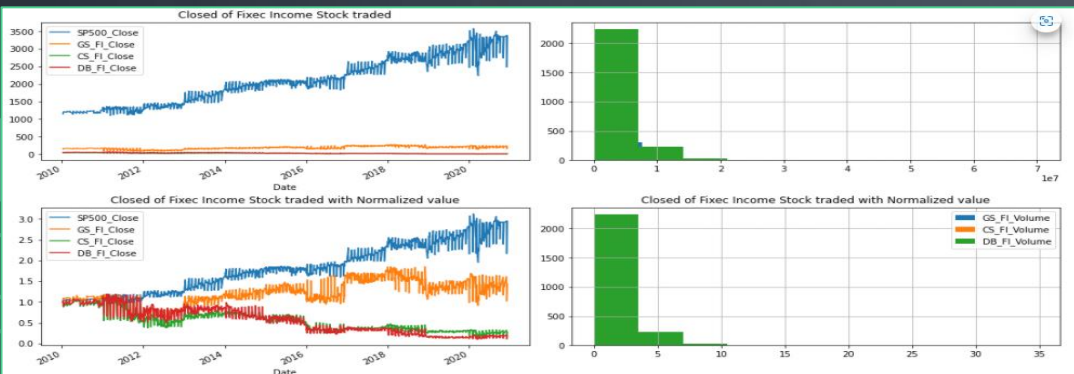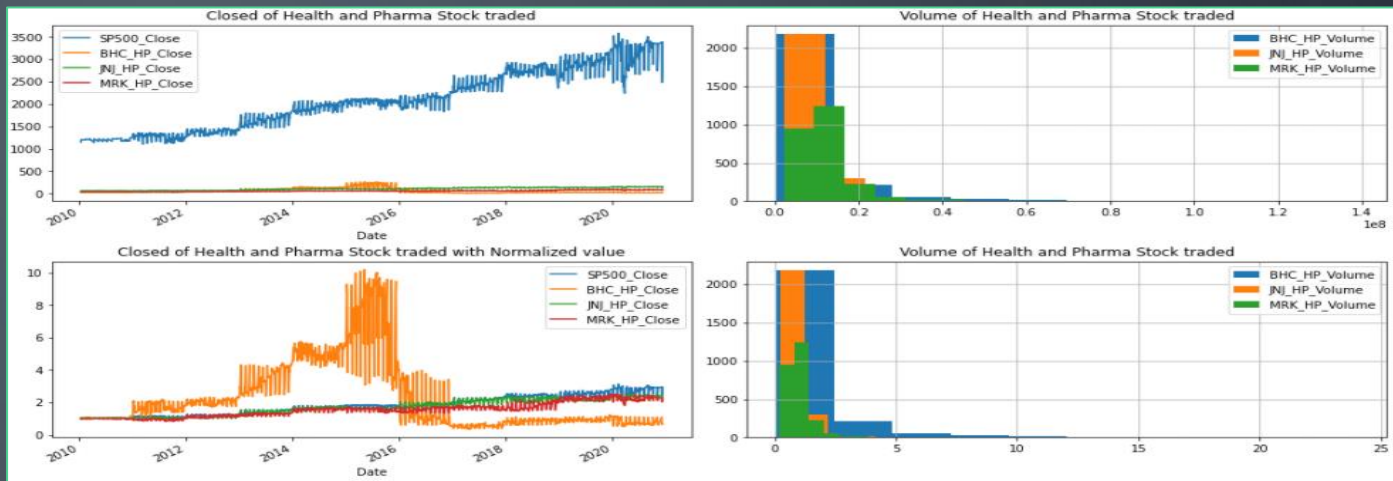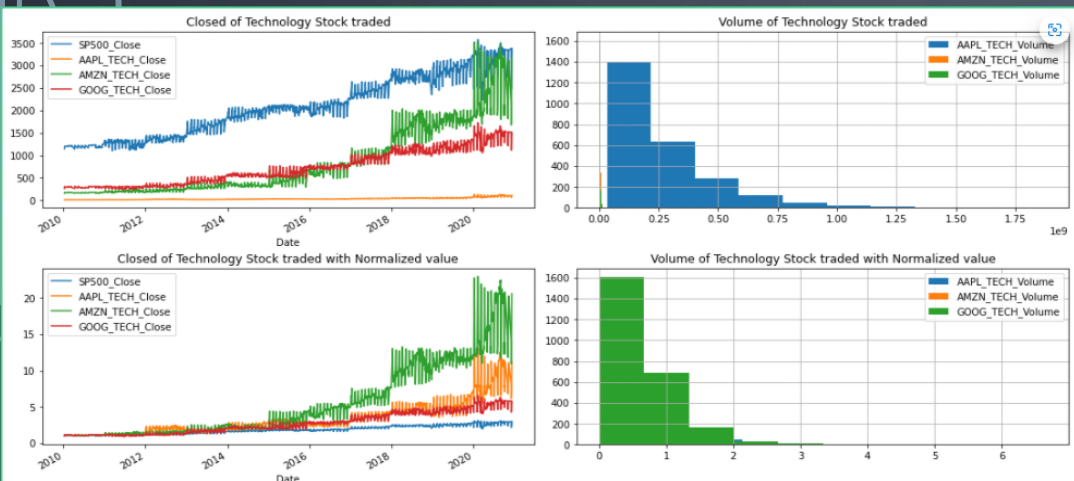
- Technology Industry: All Technology companies from year 2000 continuously growing while checking with Volume Google(GOOG) dominating the stock quantities.
- Finance Industry: In the other hand Goldman Sachs(GS) shows no trend, Deutsche Bank(DB) & Credit Suisse(CS) shows down trend. where as DB Volume dominating the stock quantities.
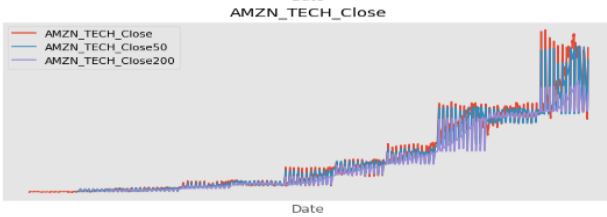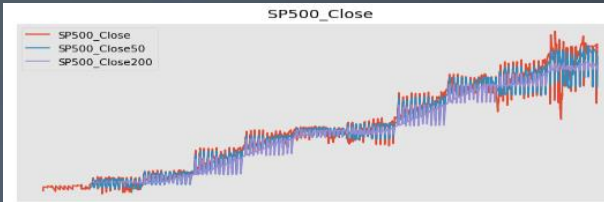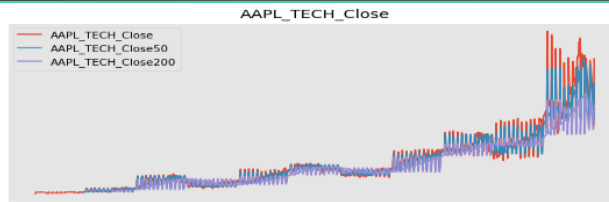- Aviation Industry: Shows no trend for all the securities where as American Airlines(AAL) Volume dominating the stock quantities.
- Health and Pharma Industry: Bausch Health(BHC) down trend, Merck and CO(MRK) and Johnson & Johnson(JNJ) shows increasing. Volume shows BHC, JNJ leads followed by MRK contribute quantities.

Factor: Closing Securities With S&P 500
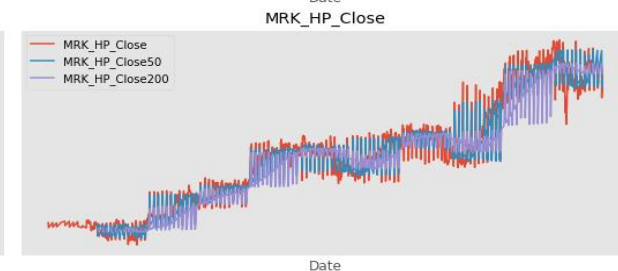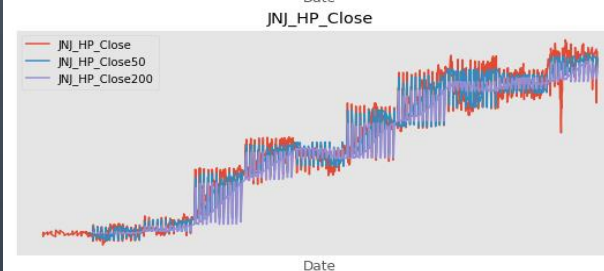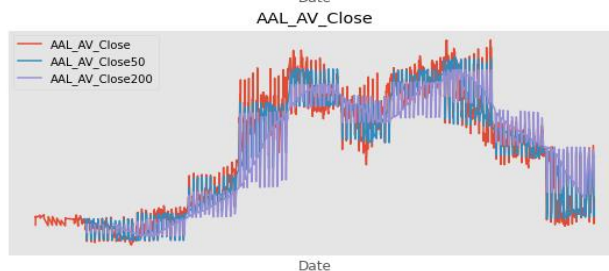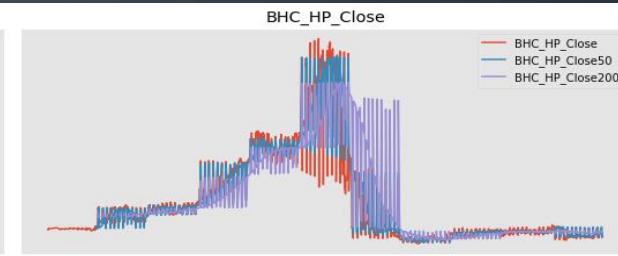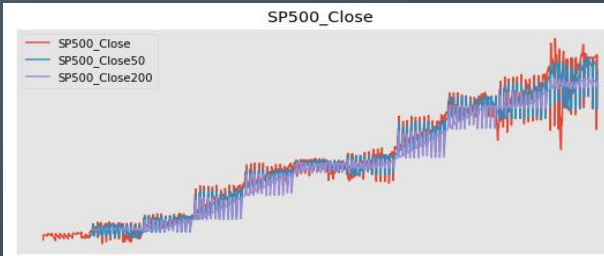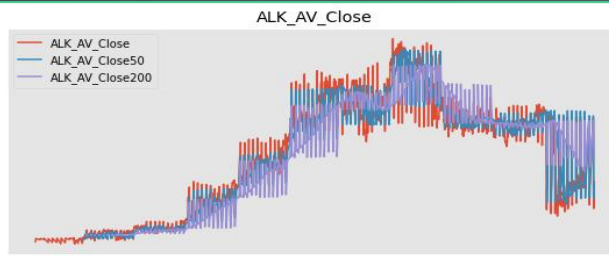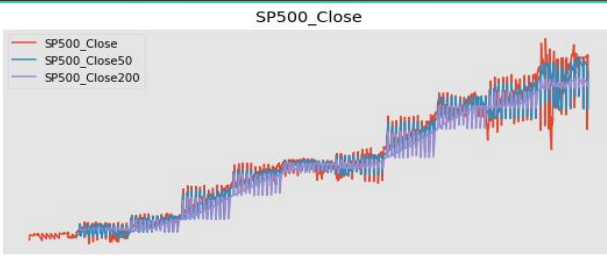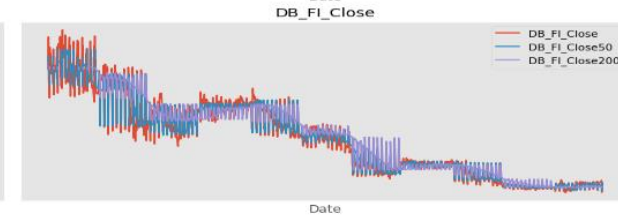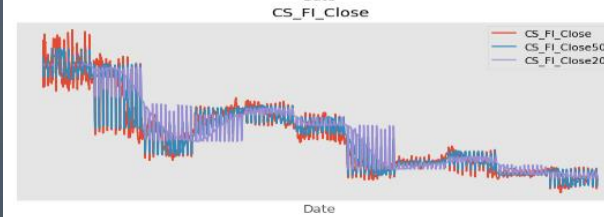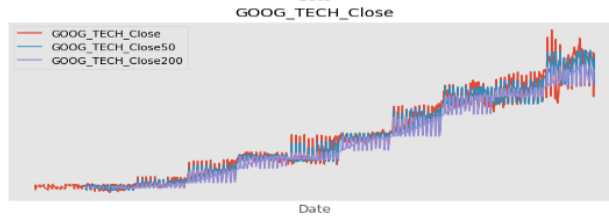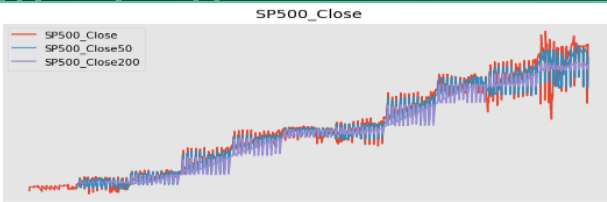

With 10 years of data, can conclude the following:

- Technology industry - exponentially increasing over the years.

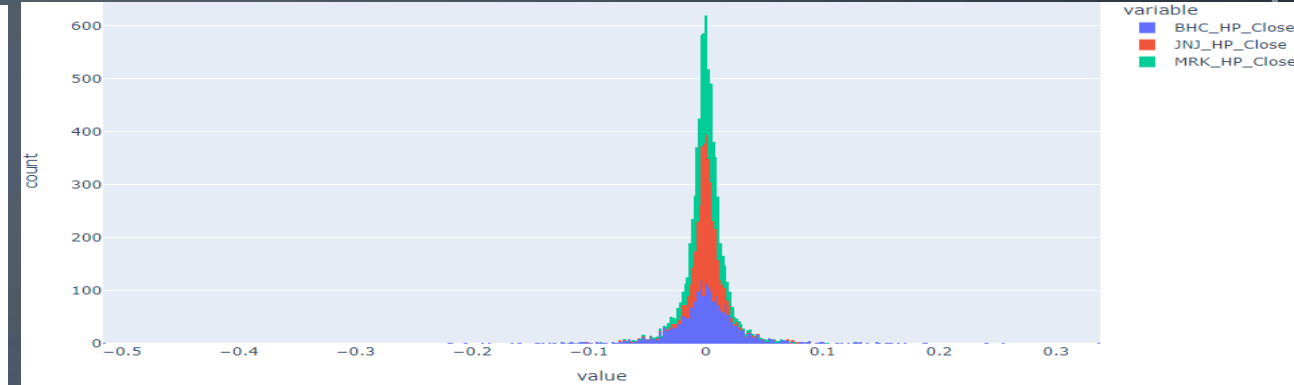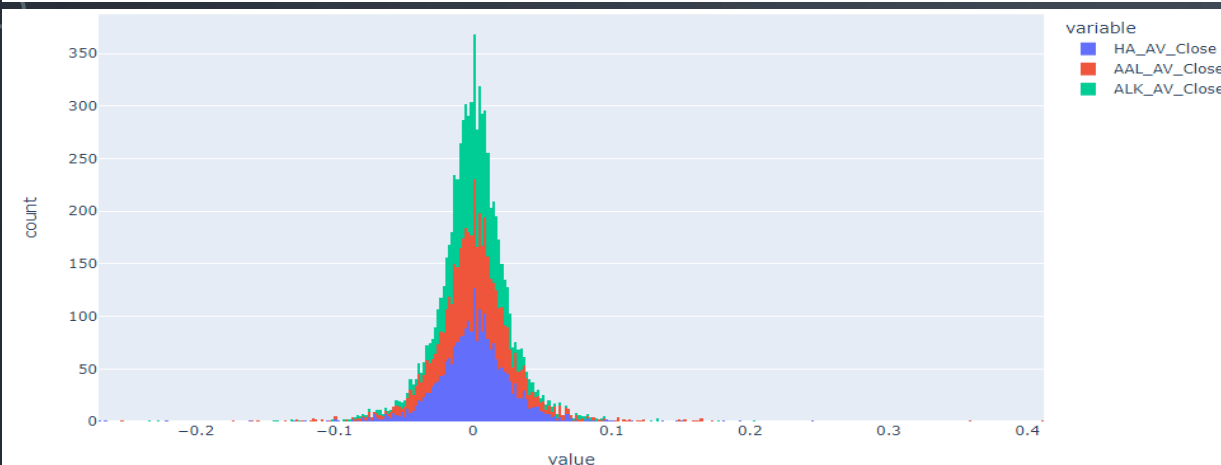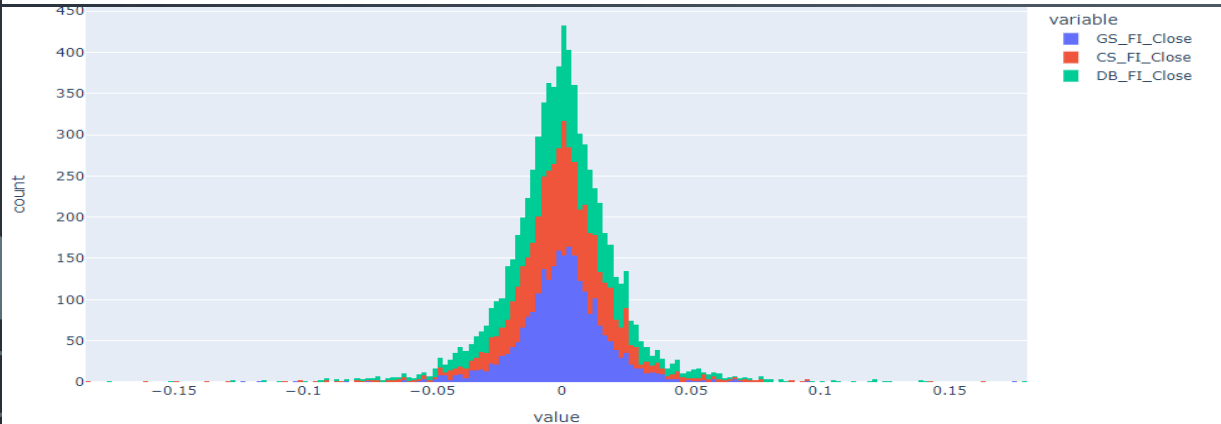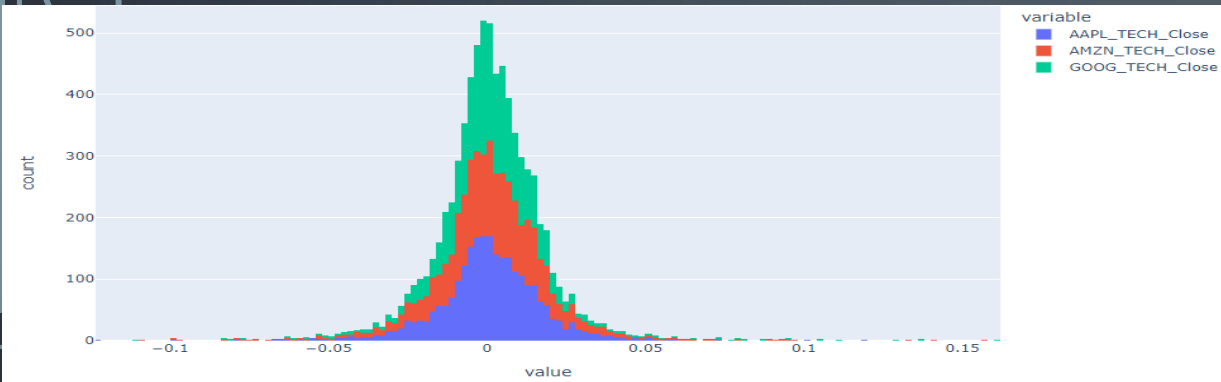- Aviation industry – Shows down trend in the recent years.

- Finance industry - GS doesn't show any trend and CS and DB leading to down trend.

- Health and Pharma industry – BHC in down trend and JNJ and MRK in reverse of uptrend.

Factor: Return Deviation – Expected Return
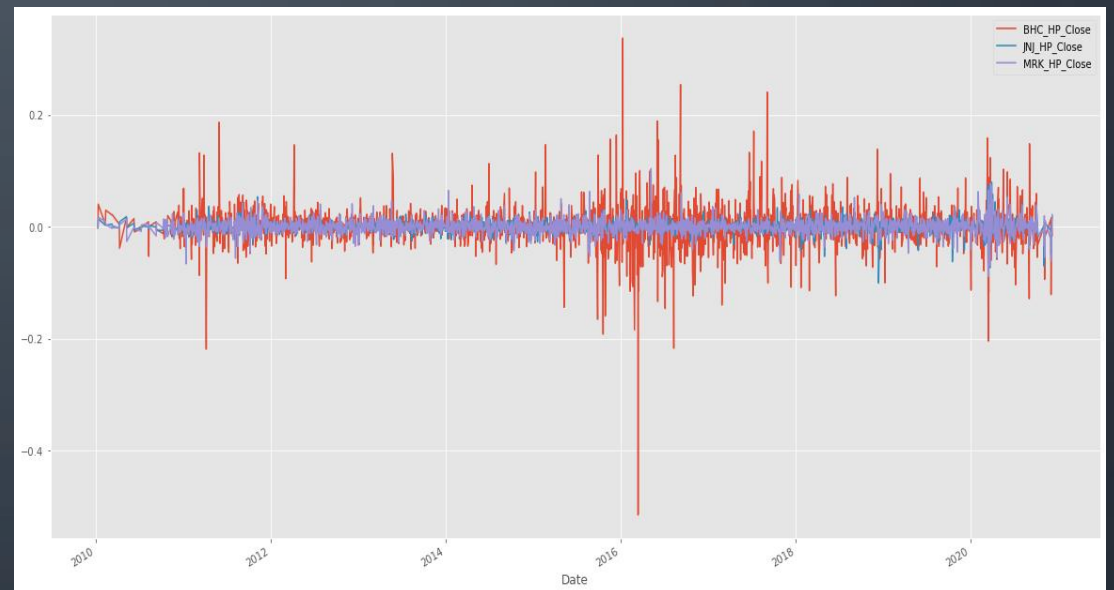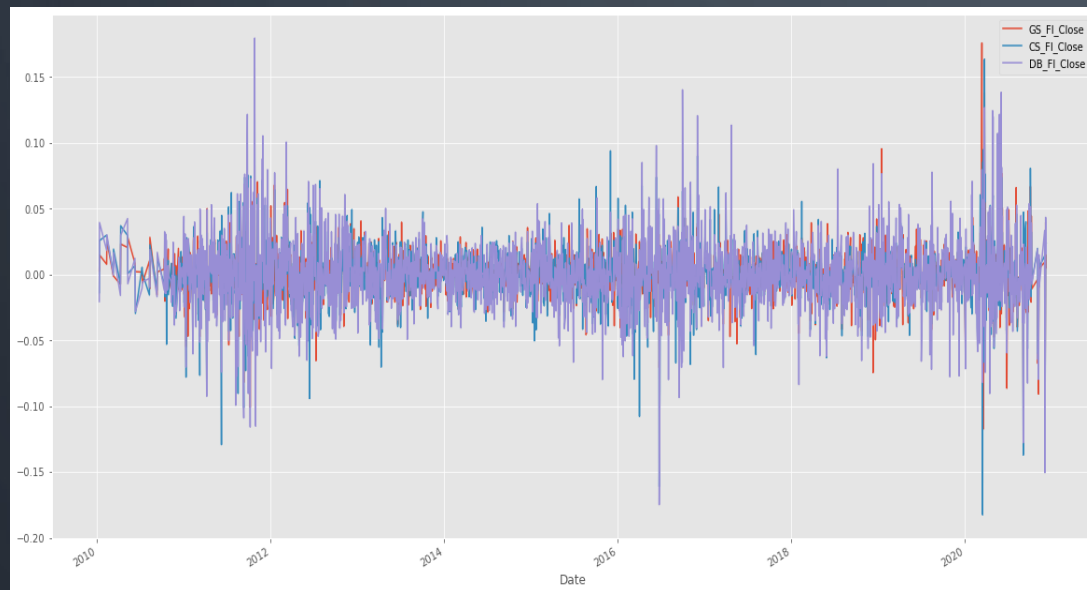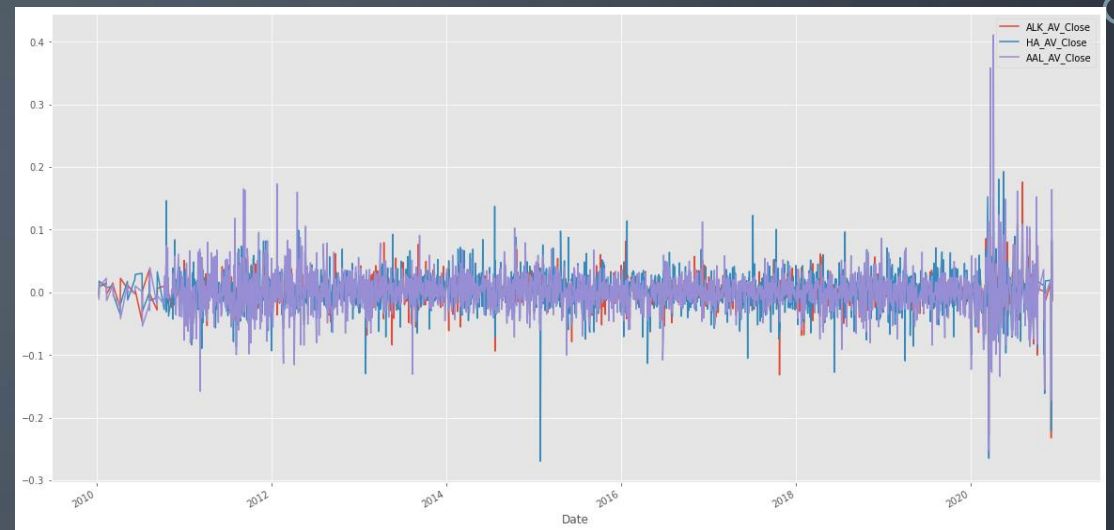
Ideal stocks should return as high and stable as possible.

Factor: Volume Spread With Mean And Max

Name: AAPL_TECH		Name: HA_AV		Name: GS_FI		Name: BHC_HP	
mean	0.001128	mean	0.000765	mean	0.000291	mean	0.000464
std	0.017719	std	0.030147	std	0.018331	std	0.035700
max	0.119808	max	0.245837	max	0.175803	max	0.337444
Name: AMZN_TECH		Name: AAL_AV		Name: CS_FI		Name: JNJ_HP	
mean	0.001398	mean	0.000637	mean	-0.000325	mean	0.000409
std	0.019889	std	0.032726	std	0.022206	std	0.010847
max	0.157457	max	0.410970	max	0.163447	max	0.079977
Name: GOOG_TECH		Name: ALK_AV		Name: DB_FI		Name: MRK_HP	
mean	0.000818	mean	0.000709	mean	-0.000381	mean	0.000410
std	0.016288	std	0.023562	std	0.026374	std	0.013049
max	0.160524	max	0.203079	max	0.179506	max	0.104080

- Above chart and table shows the Mean, Standard Deviation and Maximum value of each securities.

- STD 1: with AAPL, AMZN, GOOG, GS, JNJ & MRK

- STD 2: ALK, CS & DB

- STD 3: HA, AAL & BHC

- More spread of Standard deviation more volatile and more risk. Hence we move the STD 3 as more spread and away from mean value.

Factor: **Industries Level Correlation**
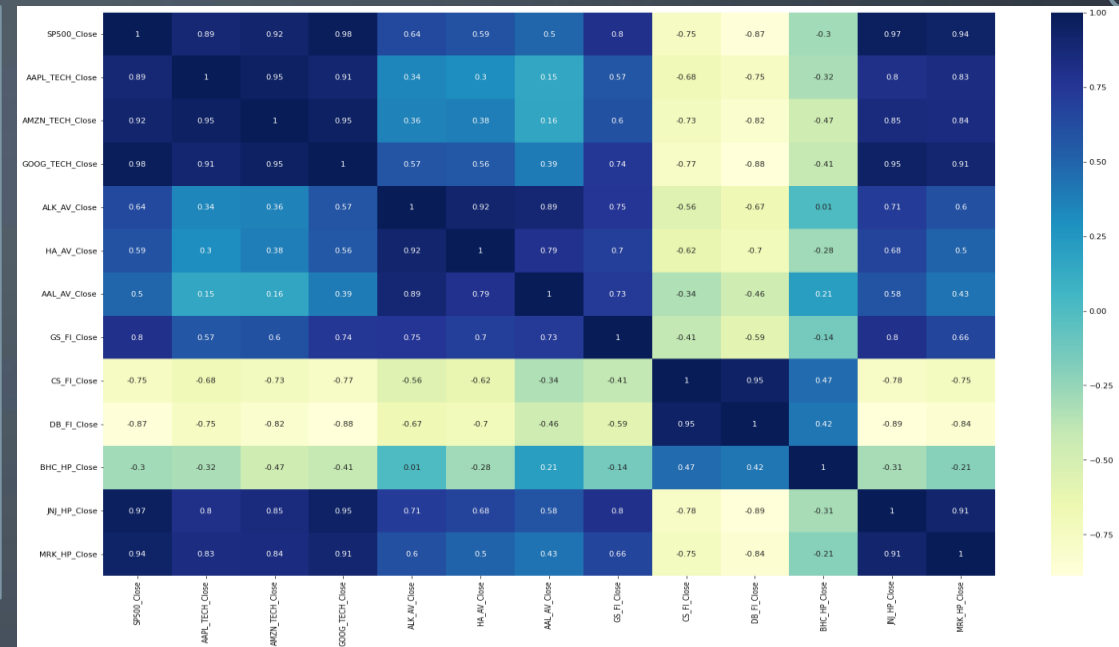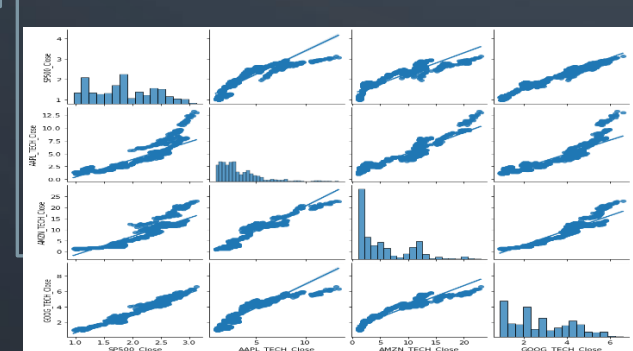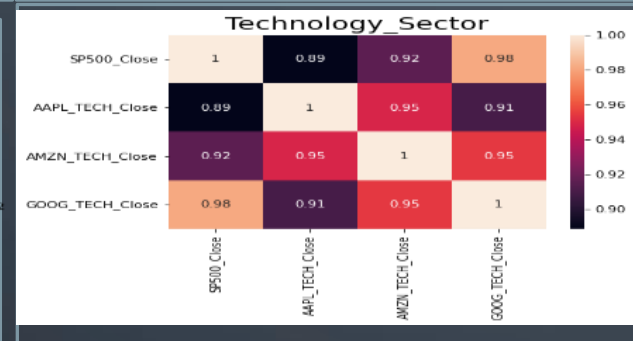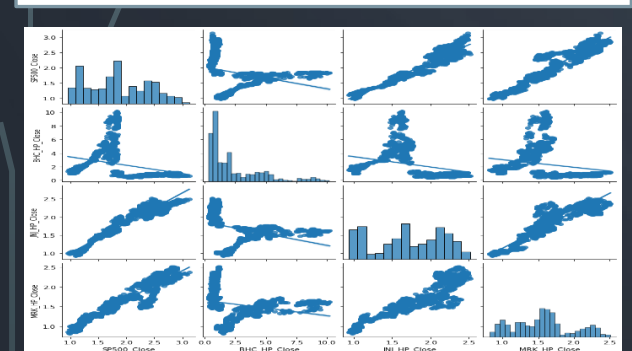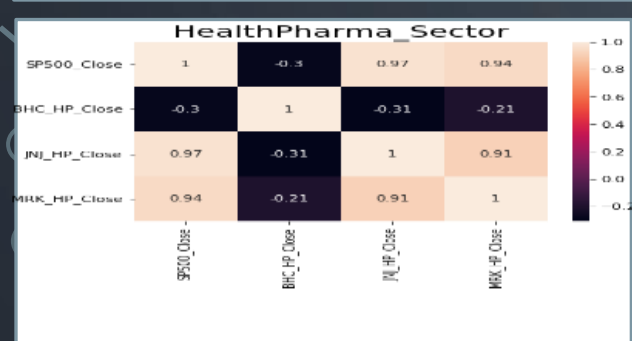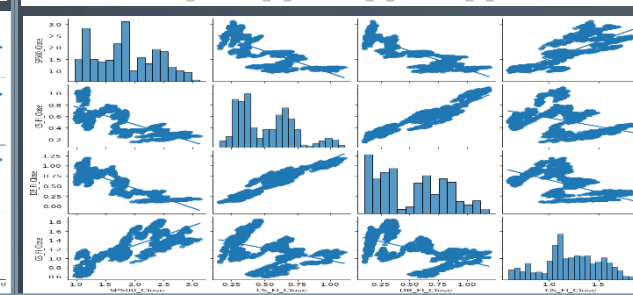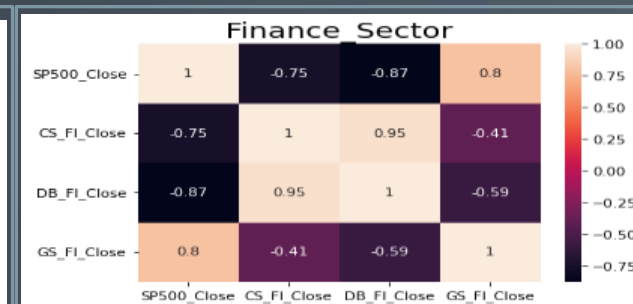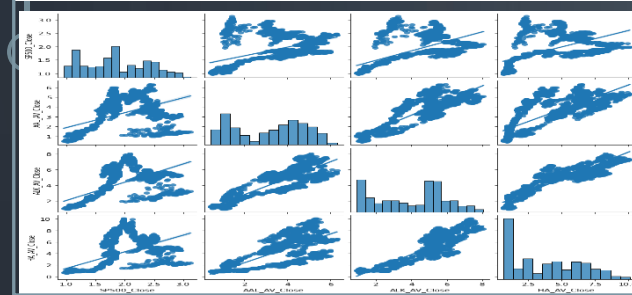
- Aviation : All the aviation securities not closely correlated with S&P 500. While checking the Volume shows not much as well.

- Finance : CS and DB negatively correlated with S&P 500. GS shows positive correlation with S&P 500. While checking the Volume DB shows more dominant as our analysis.

- Aviation : All the aviation securities not closely correlated with S&P 500. While checking the Volume shows not much as well.

- Finance : CS and DB negatively correlated with S&P 500. GS shows positive correlation with S&P 500. While checking the Volume DB shows more dominant as our analysis.

- Complete correlation compared with S&P 500 data. Dark with first column describes the positive relationship. For e.g. AAPL, AMZN, GOOG, GS, ALK, HA, JNJ & MRK.

FACTOR: Sharp Ratio & CAPM Analysis
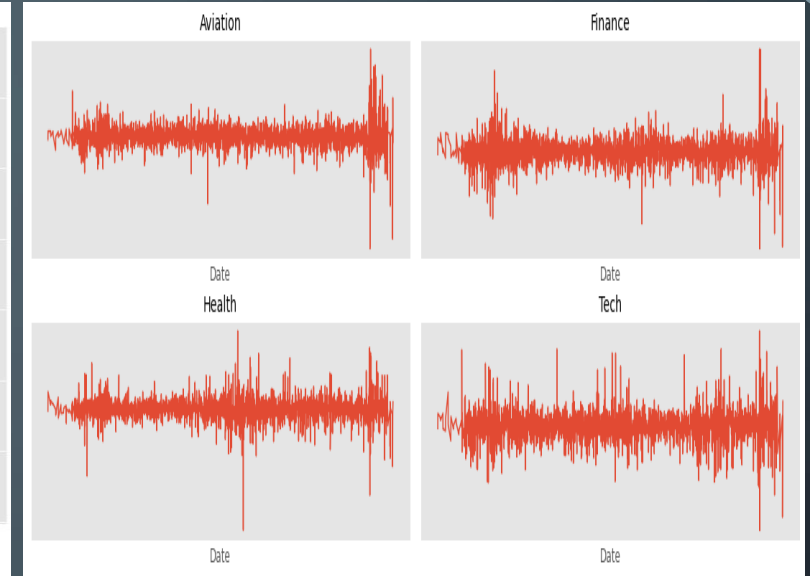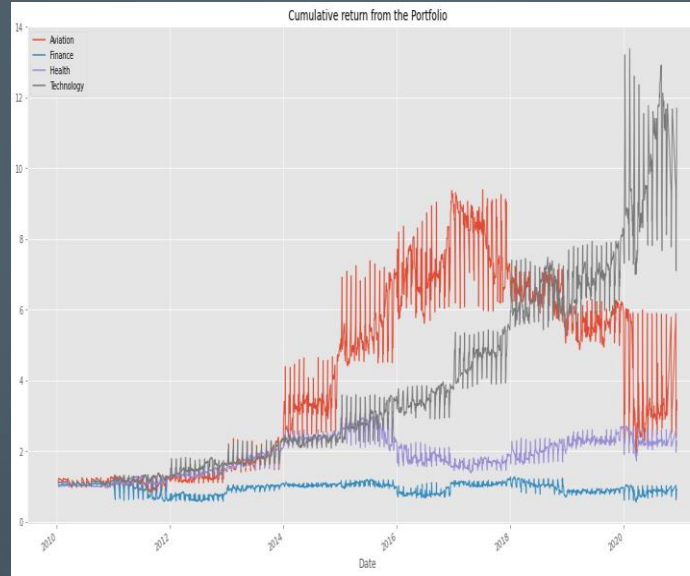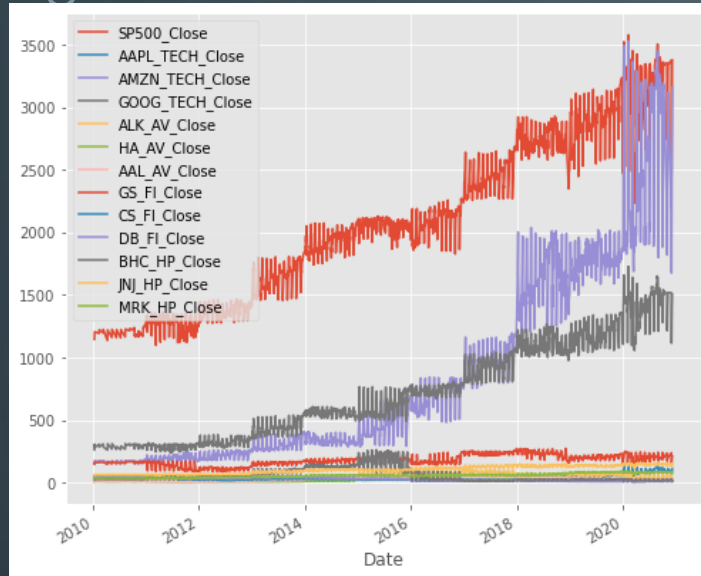
- Plotting all the securities in the chart and can easily find the Technology in the top. Followed by GS, JNJ & MRK

- Comparing the cumulative and total daily return, Technology still shows uptrend with very high frequency. Aviation in recent past shows down trend and not advisable to proceed with investment. Finance and Health industry shows promising in recent past.

- Total industry shows larger variation in prices from 2018 to 2019

- With help of Sharp ratio, we can clearly see that securities like Apple, Amazon, Google, Goldman, Merck and CO and Johnson & Johnson shows high ratio after the diversification which we can cross validate

- With CAPM model, we can see the expected return which populate very closely as per the market return and can the volatility with the Beta values

- A Beta positive means the stock is doing better than the market, and vice versa

Sharp Ratio
AAPL_TECH_Close Sharp: 1.0103
AMZN_TECH_Close Sharp: 1.1155
GOOG_TECH_Close Sharp: 0.7968
ALK_AV_Close Sharp: 0.4780
HA_AV_Close Sharp: 0.4029
AAL_AV_Close Sharp: 0.3089

Sharp Ratio
GS_FI_Close Sharp: 0.2516
CS_FI_Close Sharp: -0.2323
DB_FI_Close Sharp: -0.2295
BHC_HP_Close Sharp: 0.2064
JNJ_HP_Close Sharp: 0.5982
MRK_HP_Close Sharp: 0.4991

Name	Sharp Ratio	Beta	Market Ruturn	Expected Return
AAPL_TECH_Close	1.0103	1.06335	12.3	13.02806057
AMZN_TECH_Close	1.1155	0.9988	12.3	12.28276536
GOOG_TECH_Close	0.7968	1.01334	12.3	12.45060328
GS_FI_Close	0.2516	1.30129	12.3	15.77541776
JNJ_HP_Close	0.5982	0.66223	12.3	8.396535
MRK_HP_Close	0.4991	0.73348	12.3	9.21914399
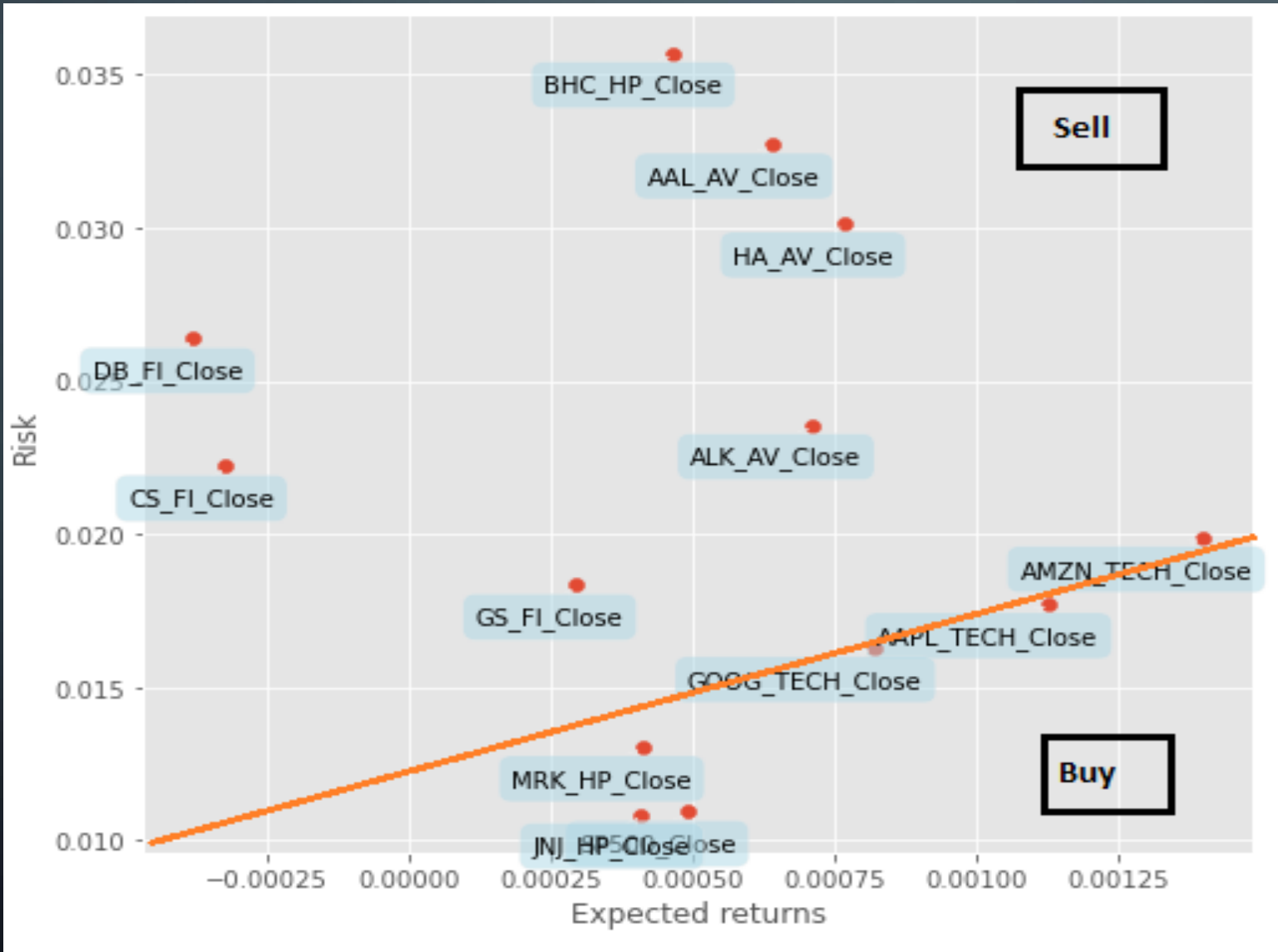
- With Stocks Returns Rate and Risk, we can derive which stock to buy and sell.

- With this we can come to an conclusion that following securities can be formed as a portfolio.

  1. AAPL
  2. AMZN
  3. GOOG
  4. GS
  5. JNJ
  6. MRK

  Summary of 3 Technology, 1 from Finance, 2 from Health and Pharma.

- We deciding with above 5 securities forms our Portfolio.
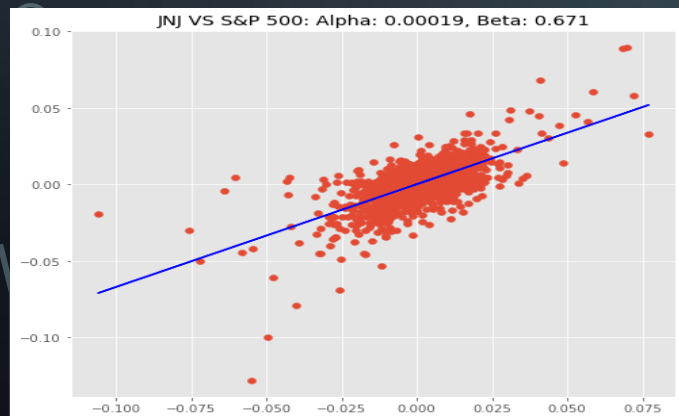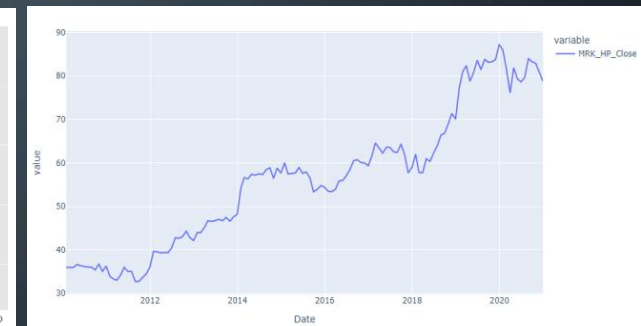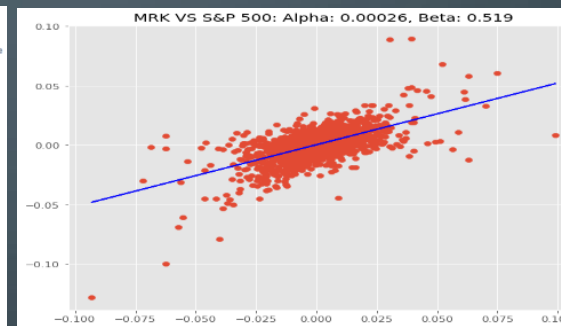
- Portfolio 1
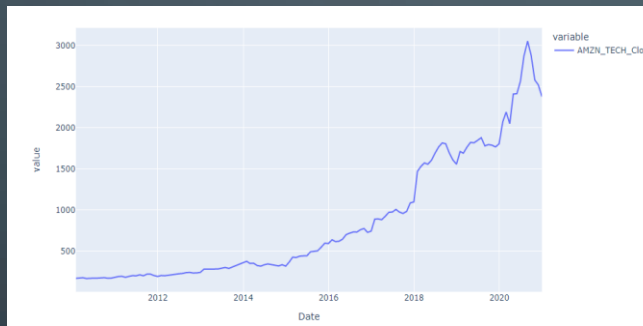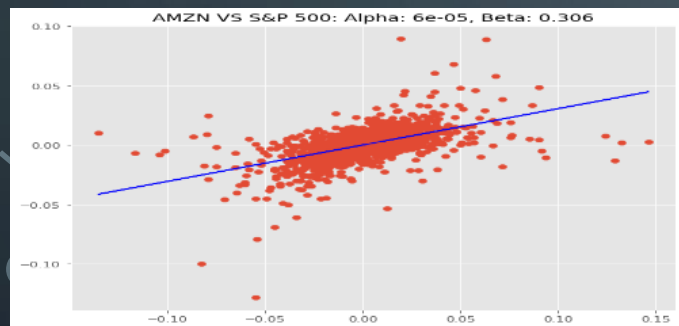- Portfolio 2
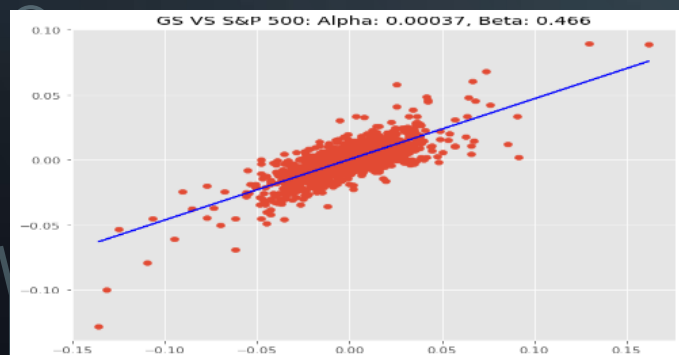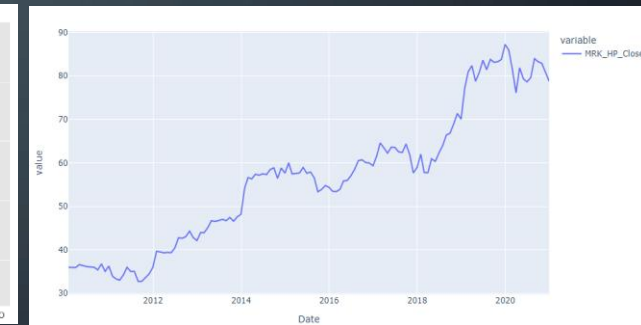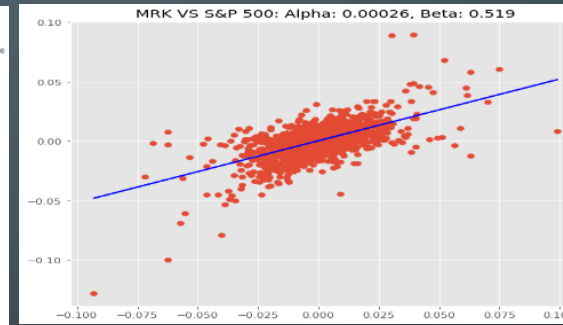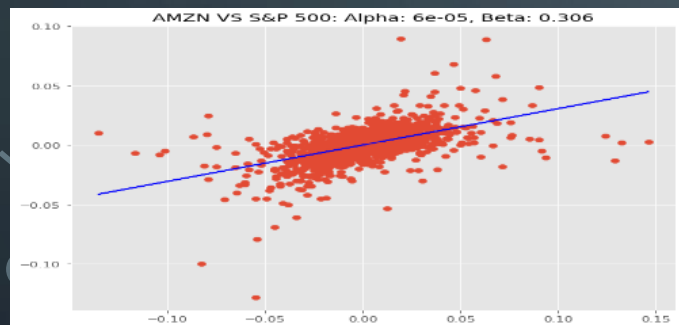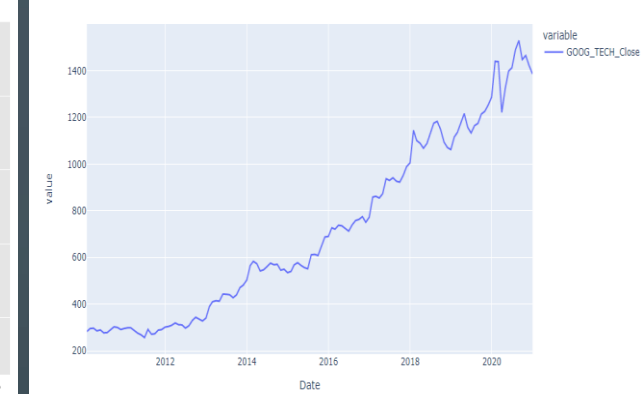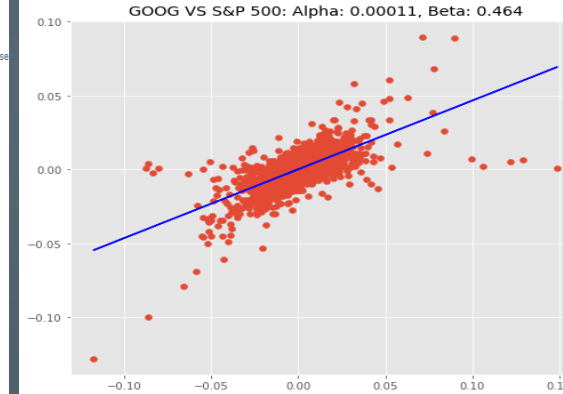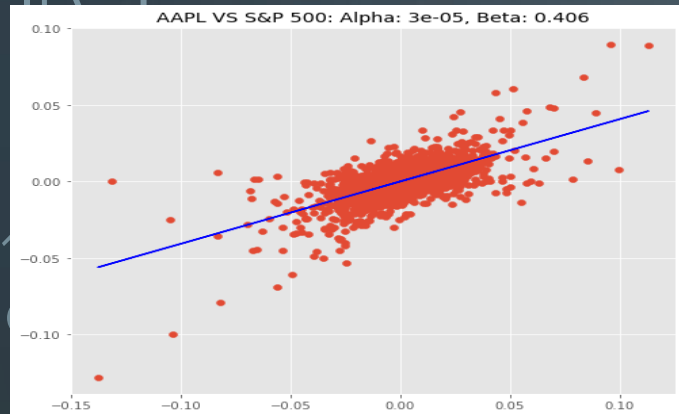
Portfolio 1
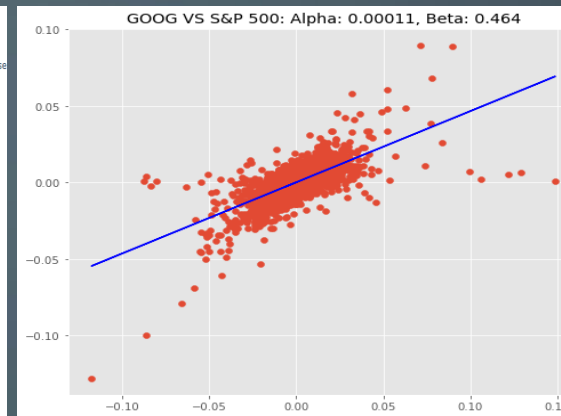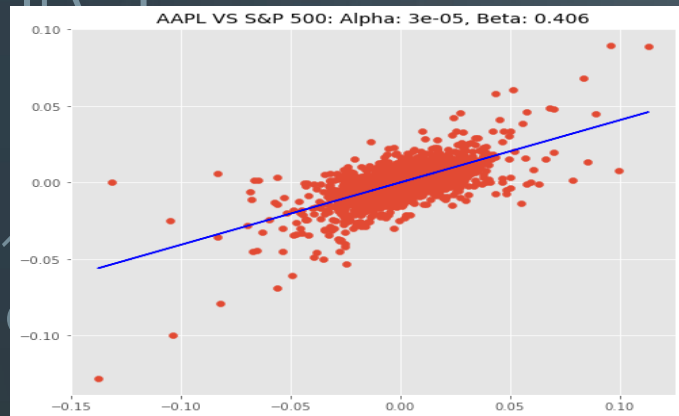
We created with following stocks:
- AAPL
- AMZN
- GOOG
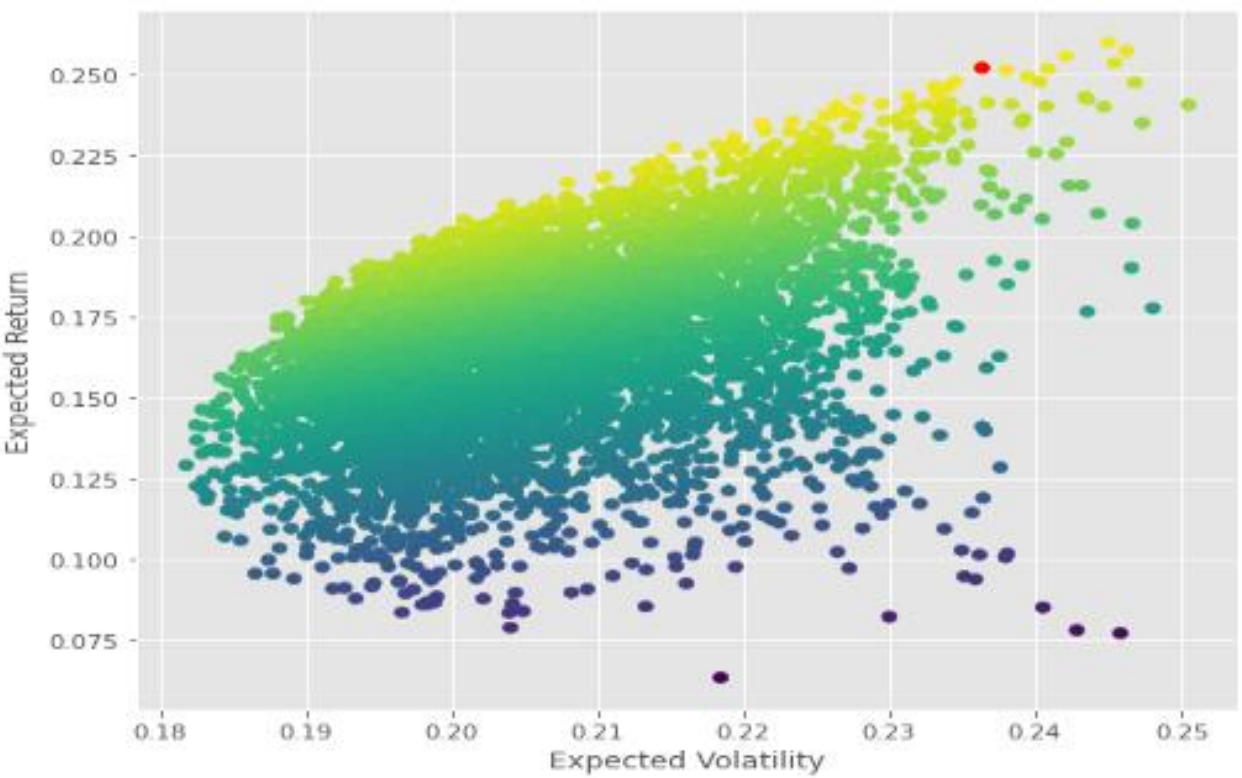- MRK
- GS

With each security comparing with S&P 500

Portfolio 2

We created with following stocks:
- AAPL
- AMZN
- GOOG
- MRK
- JNJ

With each security comparing with S&P 500

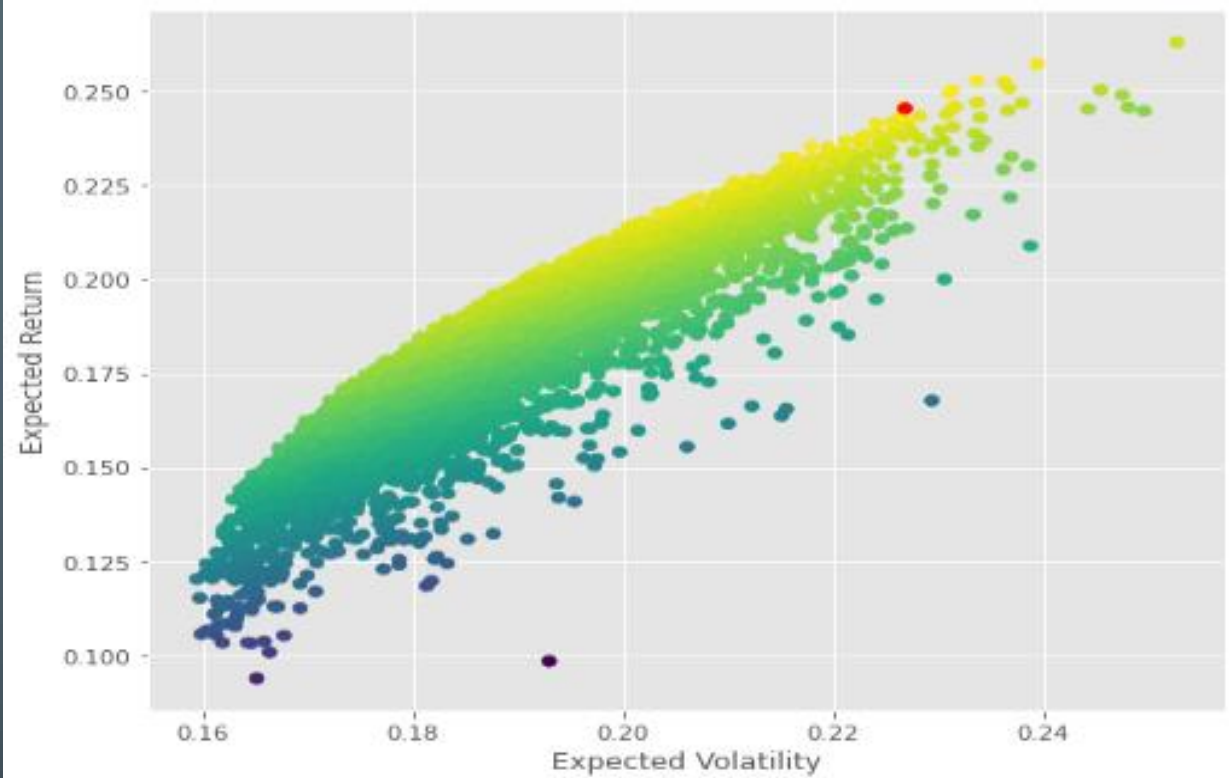# SHARPE RATIO BASED ON PORTFOLIO

PORTFOLIO 1

- Portfolio consist of following securities with various industries.

With the help of Sharpe Ratio, we can derive the following:
Expected Return – 0.0958
Expected Volatility - 0.2094
Sharpe Ratio - 0.4576
Maximum Sharpe Ratio - 1.0682
Weightage used for each securities as below:

PORTFOLIO II

- Portfolio consist of following securities with various industries.

With the help of Sharpe Ratio, we can derive the following:
Expected Return – 0.1657
Expected Volatility - 0.1806
Sharpe Ratio - 0.9174
Maximum Sharpe Ratio - 1.0838
Weightage used for each securities as below:

Securities	Securities	Ratio	Securities	Securities	Ratio
AAPL	AAPL	0.395	AAPL	AAPL	0.222
AMZN	AMZN	0.453	AMZN	AMZN	0.089
GOOG	GOOG	0.077	GOOG	GOOG	0.292
GS	GS	0.015	JNJ	JNJ	0.216
MRK	MRK	0.059	MRK	MRK	0.178

CHOOSING SELECTIVE SECURITIES FOR PORTFOLIO
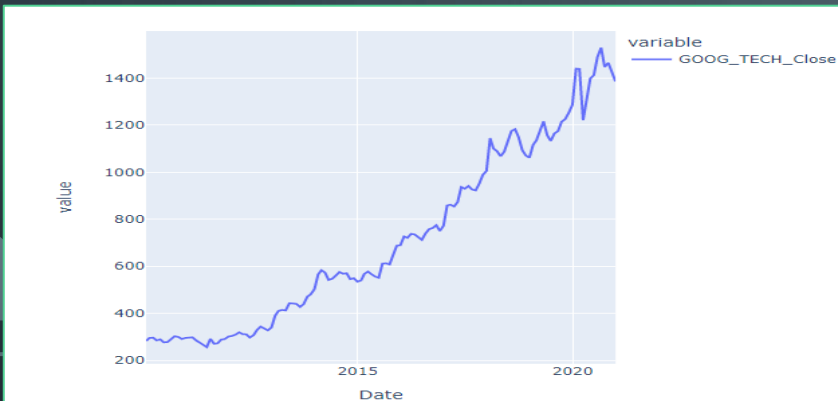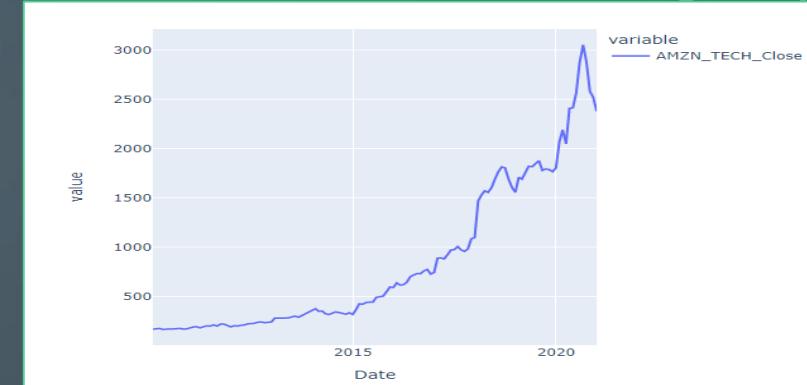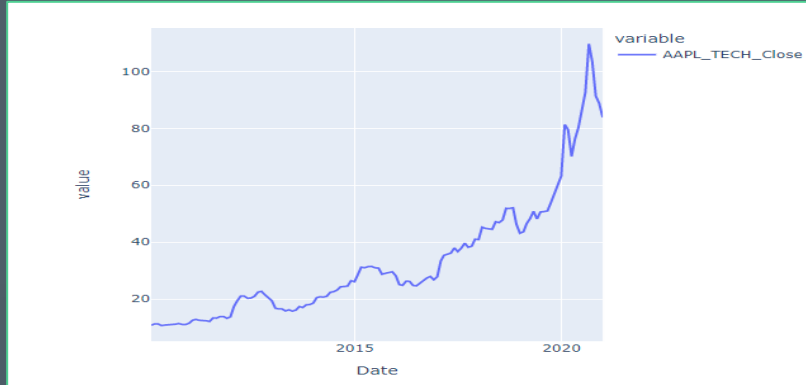
Choosing the portfolio based on the data trend and seasonal

While Plotting the securities and found the following observations

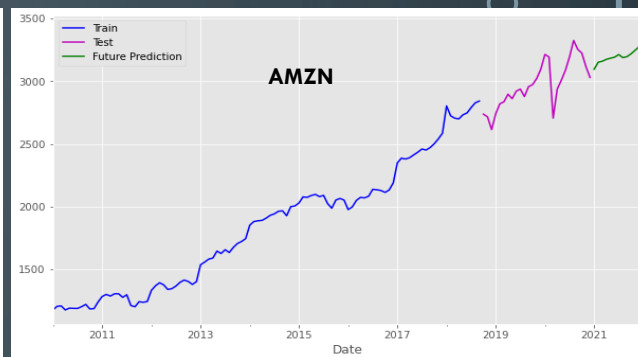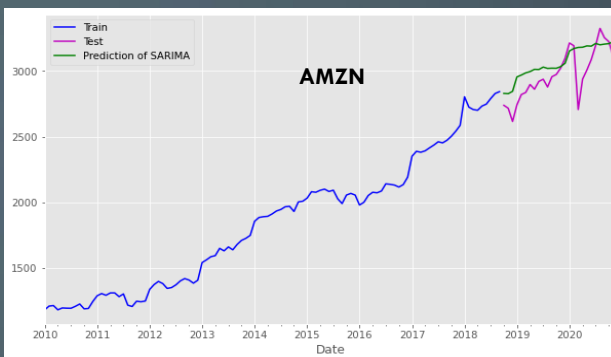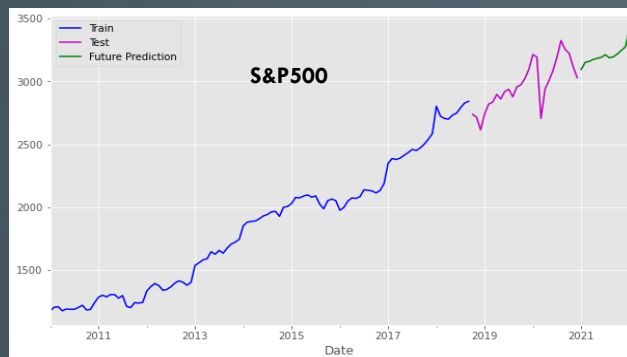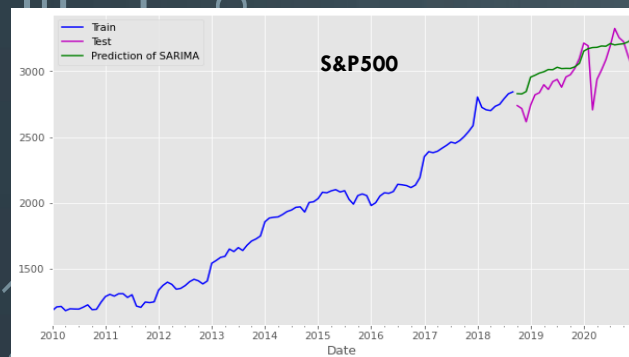We can conclude that except for GS most of the listed Securities holding both seasonal and trend. Hence easy for us to decide the Portfolio.

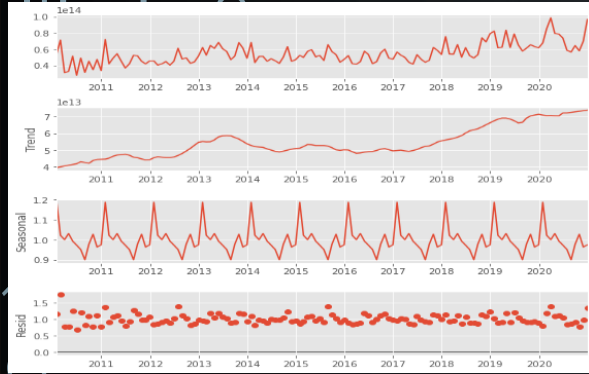| Securities	Seasonal	Trend
S&P 500	Yes	Yes
AAPL	Yes	Yes
AMZN	Yes	Yes
GOOG	Yes	Yes
GS	Yes	No
JNJ	Yes	Yes
MRK	Yes	Yes
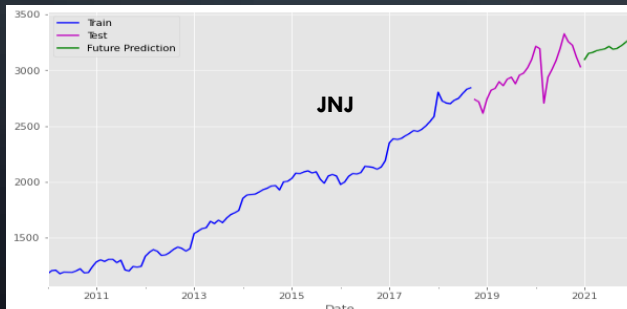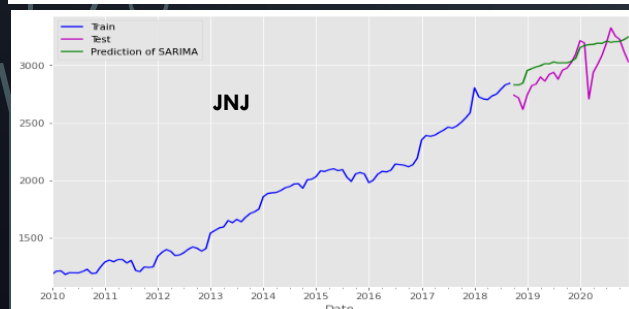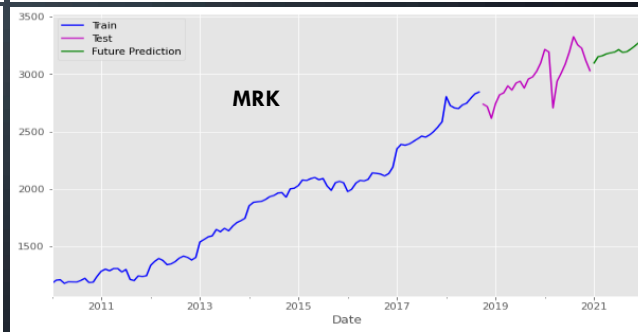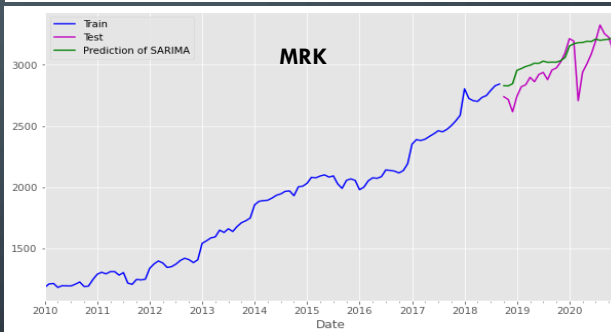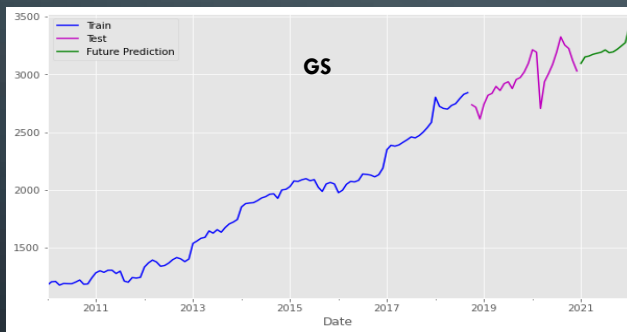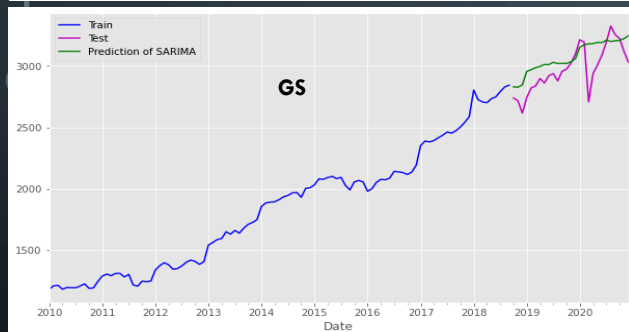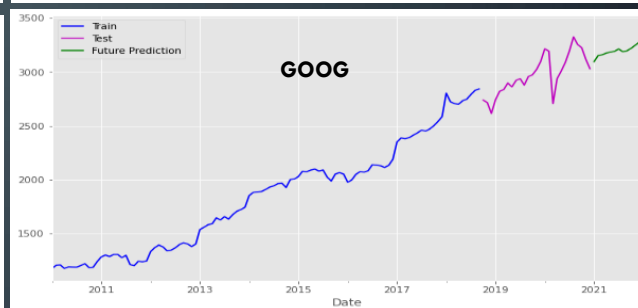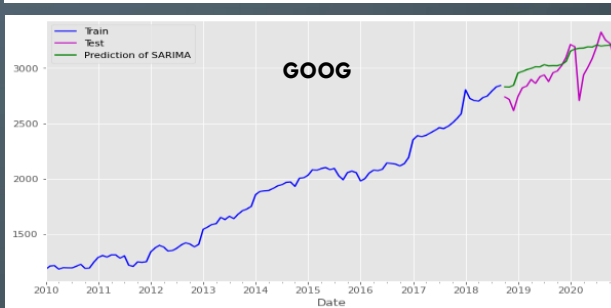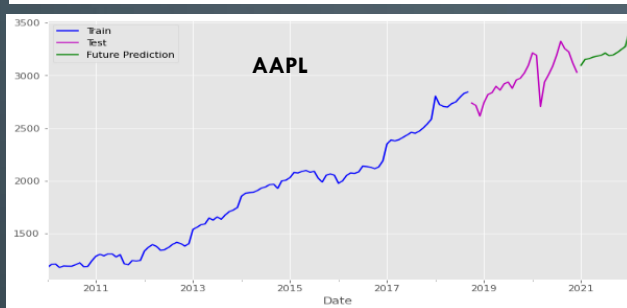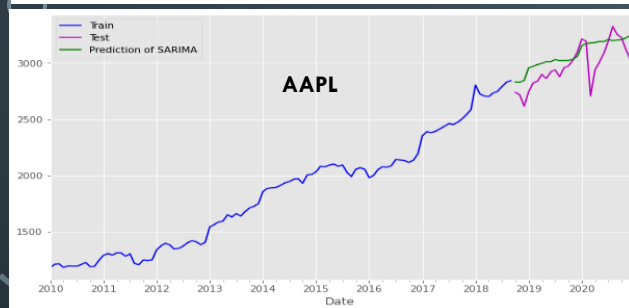
With this we can clearly understand all the securities mentioned above were positively oriented and have a uptrend. We already did forecast future data and seems looks promising.
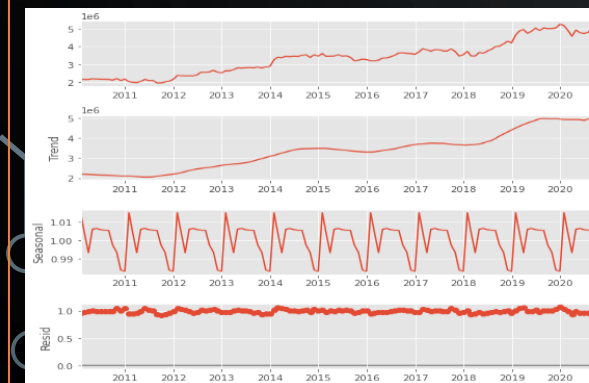
PORTFOLIO RECOMMENDATION

Portfolio 1

Portfolio 2

PORTFOLIO GROWTH

Substituting the weightage for each portfolios with the respective volumes. We can derive the above graph. Which explains that the Portfolio 2 is more stable with less residual and can provide more reasonable. Hence we recommend Alexa to go with Portfolio 2 which contains – AAPL, GOOG, AMZN, JNJ & MRK.

THANK YOU

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