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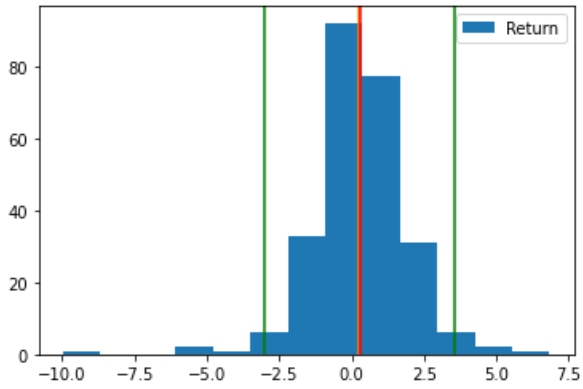
General Convention:
Red Line in Histogram - Median
Orange Line in Histogram - Mean
Green Line in Histogram - (Mean - 2*SD, Mean + 2*SD)
For each of 6 stock analysis data is taken between 1st January 2019 and 31st December 2019. We have calculated the return of each day with respect to the previous day value.

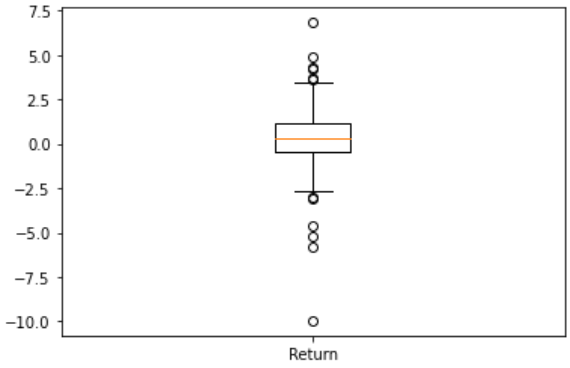
Today's Closing Value = y(t)
Yesterday Closing Value = y(t-1)
Return = [y(t) - y(t-1)]/y(t) * 100

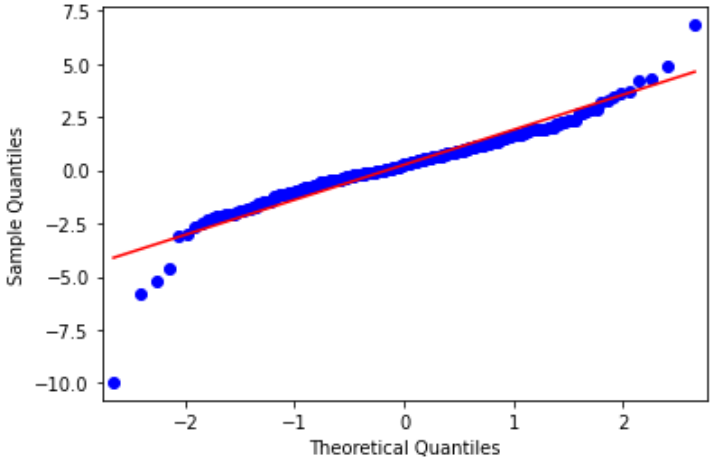
For every stock 3 graph is set for analysis

1. HIstogram for each stock return
2. Box Plot for each stock (Showing data in 1st - 3rd Quartile in Box) and representing outliers as dots
3. QQPlot for each stock. The Red Line indicates the ideal normal distribution.

1. Apple Stock Analysis







Above 3 Plots show the return percentage of Apple stock on a daily basis. Mean is 0.26 showing a slight deviation from Standard Normal Distribution. Standard Deviation of the sample is 1.6459 which is 65% more than that of Standard Normal Distribution. Data is negatively skewed with a value of -0.9066 and Kurtosis equal to 7.00. High kurtosis value signifies presence of a large number of outliers as evident by the box and QQPlot. P Value of Skew Test as well as Kurtosis test for this data is negligible strongly opposing null hypothesis of data being from normal distribution.

Summary of the Apple stock return

```
Mean is:  0.26057059797942517
Standard deviation is:  1.6459549972153602
Median is:  0.275252995760189
Skewness of the distribution is:  -0.9066413114103413
Skewtest of the distribution is:
SkewtestResult(statistic=-5.256202930970021, pvalue=1.470600157903429e-07)
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Kurtosis of the distribution is:  7.002579343311439
Kurtosis test of the distribution is:
KurtosistestResult(statistic=6.728824415380868,
pvalue=1.7103929728413623e-11)
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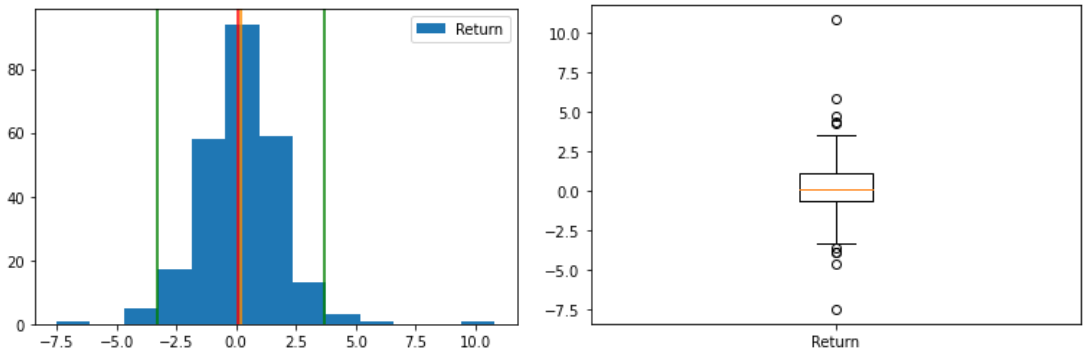
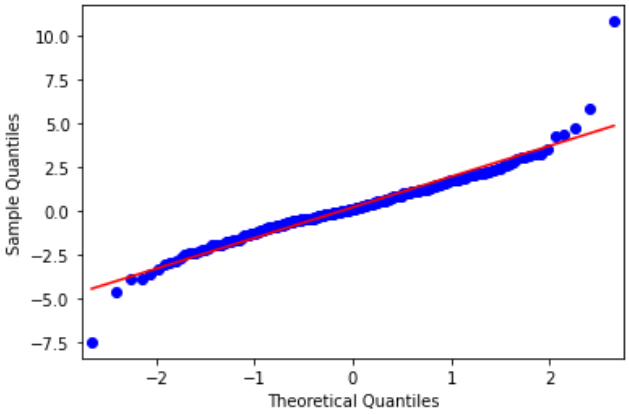
2. Facebook stock return analysis





Above 3 Plots show the return percentage of Facebook stock on a daily basis. Mean is 0.19 showing a slight deviation from Standard Normal Distribution. Standard Deviation of the sample is 1.75 which is 75% more than that of Standard Normal Distribution. Data is positively skewed with a value of 0.6066 and Kurtosis equal to 6.16. High kurtosis value signifies presence of a large number of outliers as evident by the box and QQPlot. P Value of Skew Test as well as Kurtosis test for this data is less than 0.01 signifying against null hypothesis of data being from normal distribution.

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Summary of the Facebook stock return

Mean is:  0.19331269999856776
Standard deviation is:  1.752615007884313
Median is:  0.10256425204406838
Skewness of the distribution is:  0.6066155840876527
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Skewtest of the distribution is:
SkewtestResult(statistic=3.760033371589946, pvalue=0.00016989069235316068)
Kurtosis of the distribution is:  6.165784944489916
Kurtosis test of the distribution is:
KurtosistestResult(statistic=6.4403503139348155,
pvalue=1.191980602739184e-10)
```
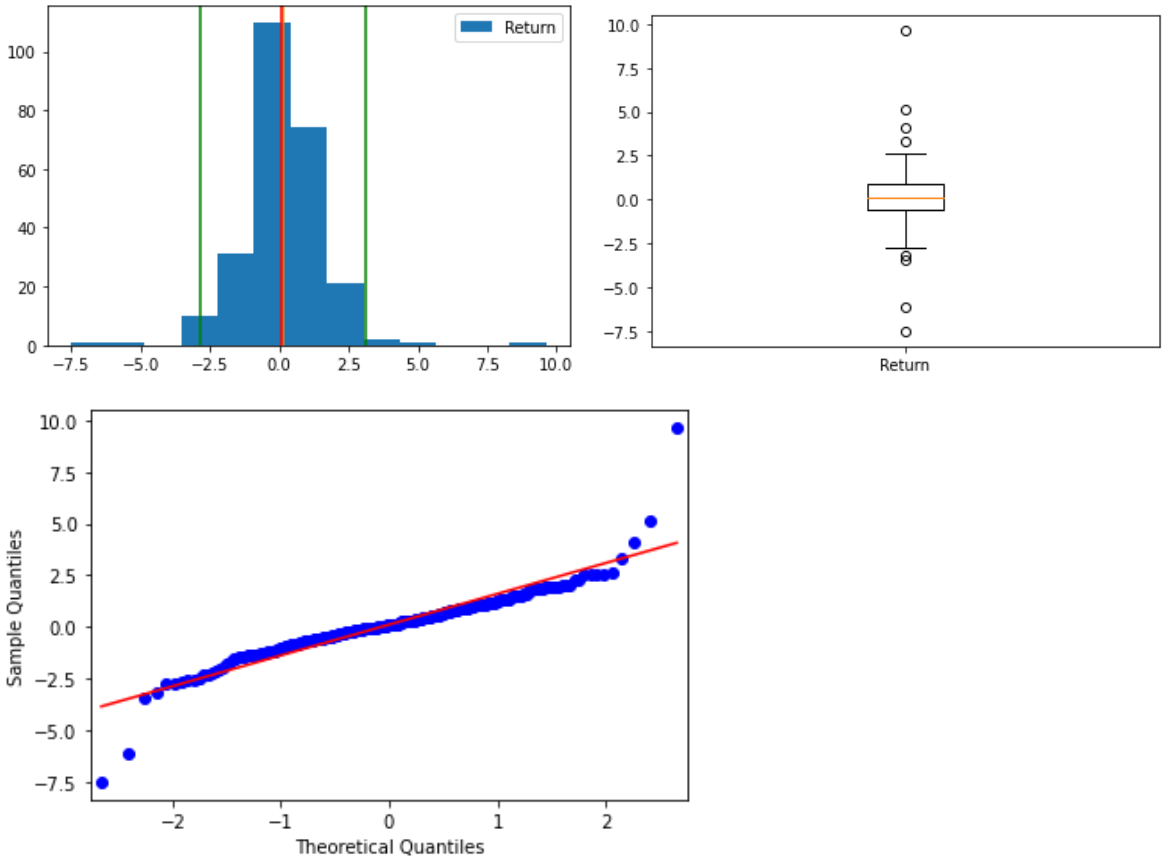

3. Google stock return analysis



Above 3 Plots show the return percentage of Google stock on a daily basis. Mean is 0.1096 showing a slight deviation from Standard Normal Distribution. Standard Deviation of the sample is 1.49. Data is positively skewed with a value of 0.313 and Kurtosis equal to 9.40. High kurtosis value signifies presence of a large number of outliers as evident by the box and QQPlot. P Value of Skew Test is 0.04, but for Kurtosis test for this data is less than 0.01 signifying against null hypothesis of data being from normal distribution.

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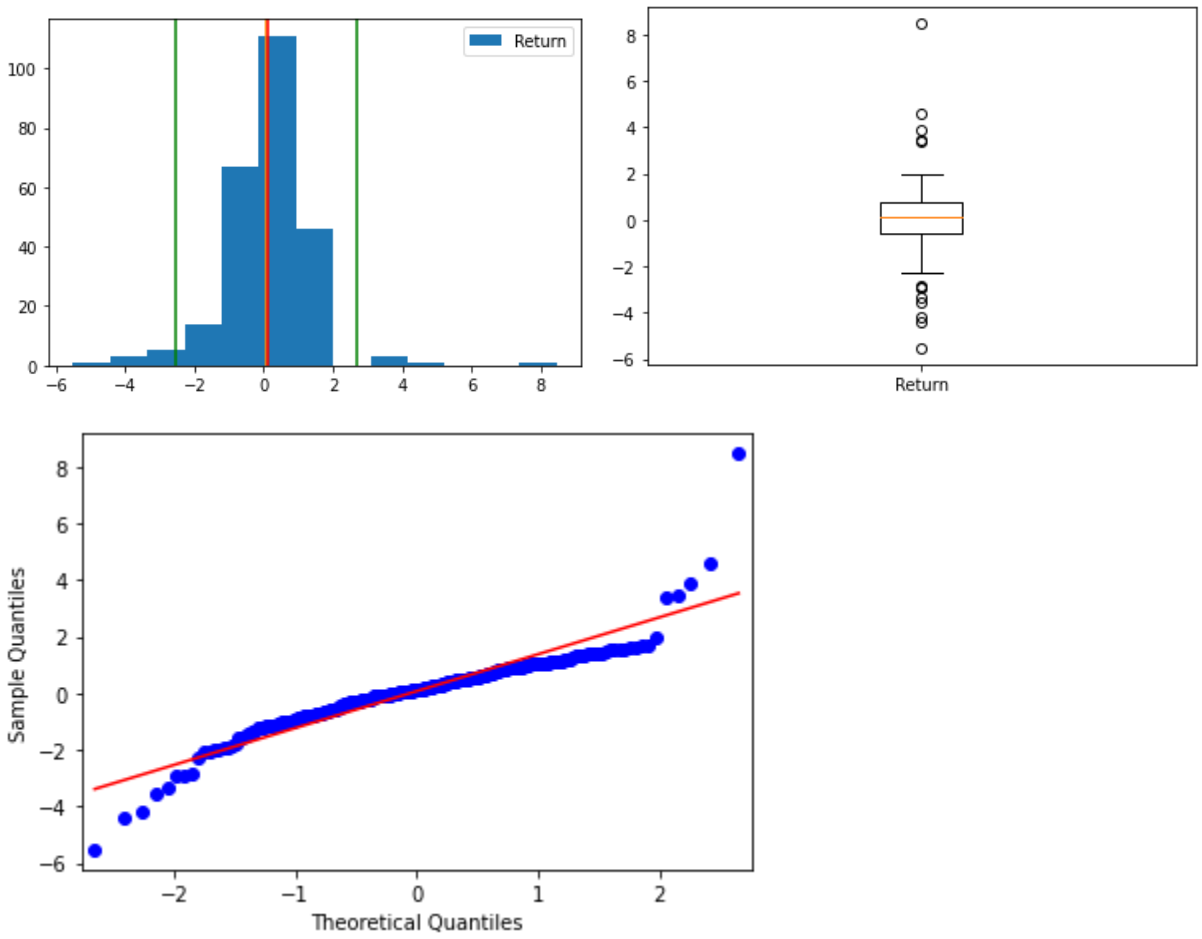
Summary of the Google stock return

Mean is:  0.10962322799682747
Standard deviation is:  1.490020849242543
Median is:  0.08828280592479976
Skewness of the distribution is:  0.3138207931435499
Skewtest of the distribution is:
SkewtestResult(statistic=2.0458841345431784, pvalue=0.04076777164885959)
Kurtosis of the distribution is:  9.40531667648051
Kurtosis test of the distribution is:
KurtosistestResult(statistic=7.381680334517604,
pvalue=1.563041170552381e-13)
```

4. IBM Stock return analysis



Above 3 Plots show the return percentage of IBM stock on a daily basis. Mean is 0.0738 showing a slight deviation from Standard Normal Distribution. Standard Deviation of the sample

is 1.30. Data is positively skewed with a value of 0.473 and Kurtosis equal to 8.67. High kurtosis value signifies presence of a large number of outliers as evident by the box and QQPlot. P Value of Skew Test is 0.02, but for Kurtosis test for this sample is negligible, strongly opposing the null hypothesis of data being from normal distribution.

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Summary of IBM stock return analysis

Mean is:  0.07386940263543147
Standard deviation is:  1.3014622424599644
Median is:  0.13773907711658318
Skewness of the distribution is:  0.4729969183532287
Skewtest of the distribution is:
SkewtestResult(statistic=3.008096313205969, pvalue=0.0026288980807748614)
Kurtosis of the distribution is:  8.673436059138927
Kurtosis test of the distribution is:
KurtosistestResult(statistic=7.20495943025786,
pvalue=5.806113410867062e-13)
```
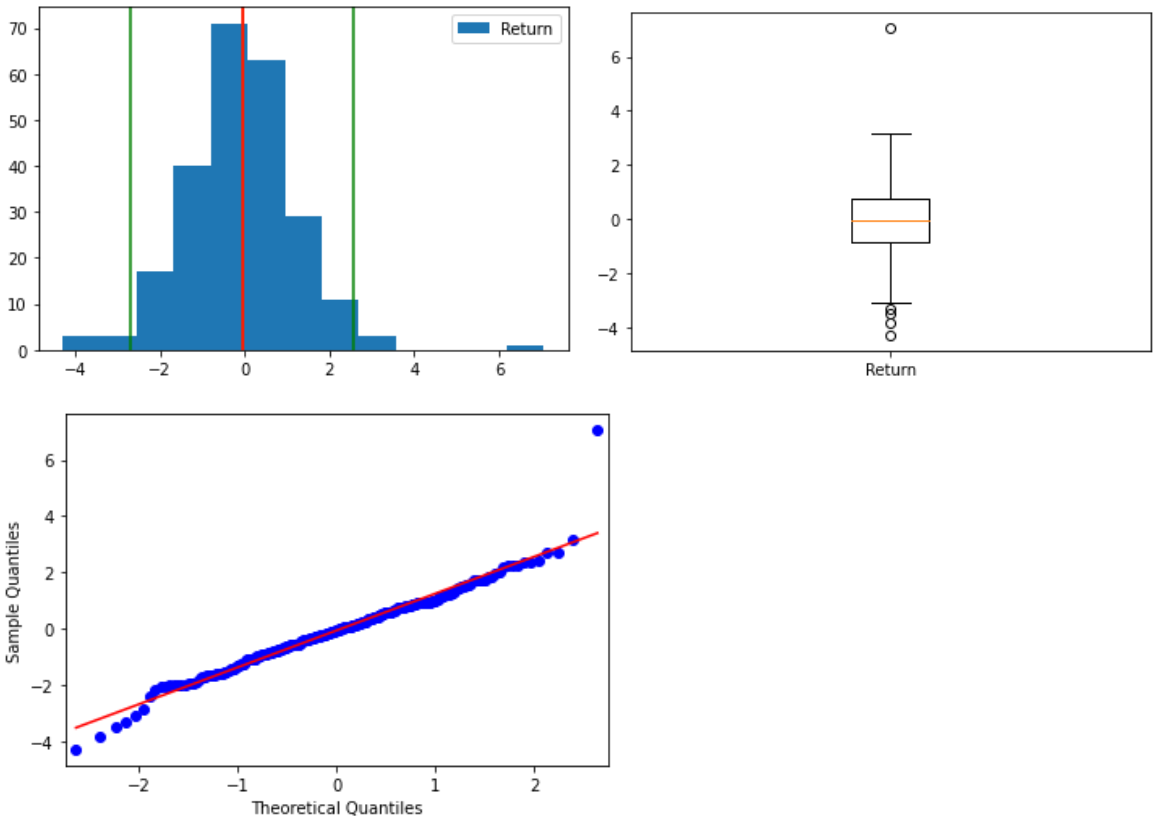

5. ITC Stock return analysis



Above 3 Plots show the return percentage of ITC stock on a daily basis. Mean is -0.06 showing a negative return on average and deviation from Standard Normal Distribution. Standard Deviation of the sample is 1.31. Data is positively skewed with a value of 0.398 and Kurtosis equal to 3.29. High kurtosis value signifies presence of a large number of outliers as evident by the box plot and QQPlot. Outliers are present on the negative side thus reducing the mean return. P Value of Skew Test is 0.012, but for Kurtosis test for this data is negligible signifying against null hypothesis of data being from normal distribution.

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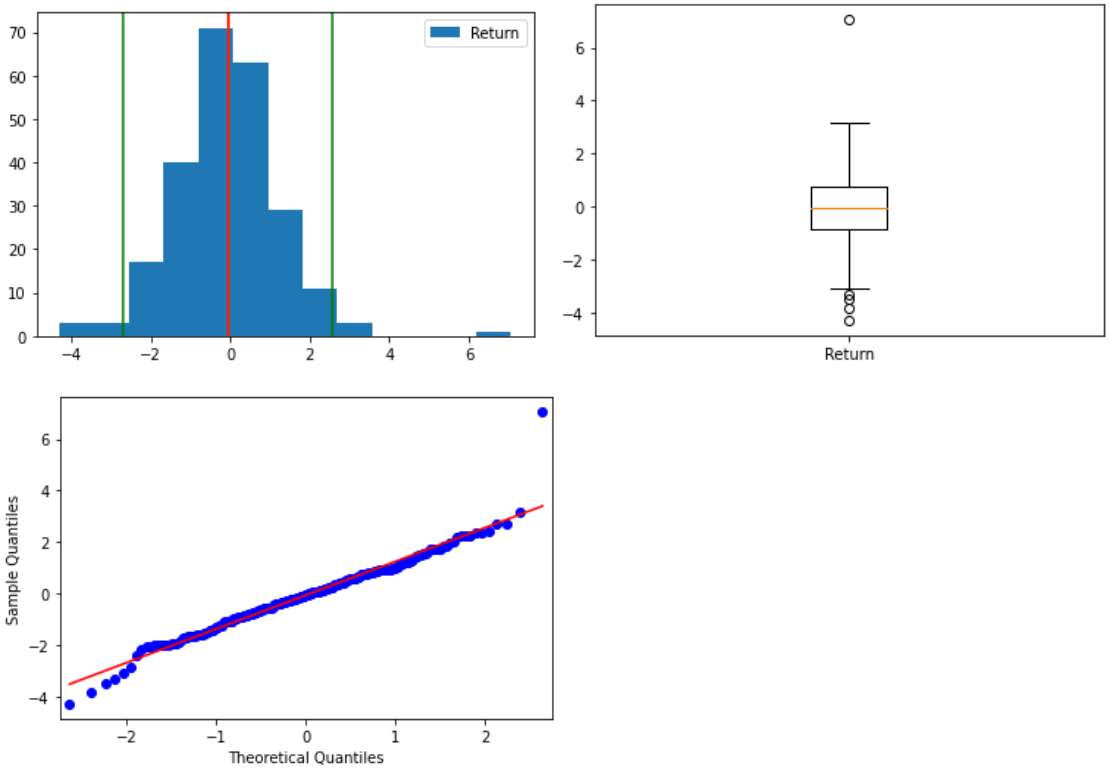
Summary of IBM Stock return

Mean is:  -0.06334093490607351
Standard deviation is:  1.3110447550456212
Median is:  -0.06278522407555664
Skewness of the distribution is:  0.39846214121795037
Skewtest of the distribution is:
SkewtestResult(statistic=2.51260927129629, pvalue=0.01198419848679624)
Kurtosis of the distribution is:  3.291157366118382
Kurtosis test of the distribution is:
KurtosistestResult(statistic=4.909651505848799,
pvalue=9.123838727868614e-07)
```

6. Infosys Stock Return Analysis



Above 3 Plots show the return percentage of Infosys stock on a daily basis. Mean is 0.05 showing a negative return on average and deviation from Standard Normal Distribution. Standard Deviation of the sample is 1.75. Data is negatively skewed with a value of -2.962 and Kurtosis equal to 29.60. Such high kurtosis gives strong evidence of data not following normal distribution from which sample is taken.

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Summary of Infosys Stock Return Analysis

Mean is:  0.05538668323413108
Standard deviation is:  1.7576333134445263
Median is:  0.04362697339963528
Skewness of the distribution is:  -2.9621672011838465
Skewtest of the distribution is:  SkewtestResult(statistic=-10.901639445896878,
pvalue=1.1319903590046008e-27)
Kurtosis of the distribution is:  29.80732240398826
Kurtosis test of the distribution is:
KurtosistestResult(statistic=9.450027911947172, pvalue=3.387403602169322e-21)
```

Conclusion

In general, we found that all 6 stock returns samples don't represent the normal distribution of data. Also their kurtosis was very high signifying the outliers. In general, stock prices are affected by a lot of other factors and hence they deviate from normal distribution. So in conclusion, normal distribution is very strong assumption which seems to be failing in all 6 samples.