Minitest1_Thanachote.R

user

2021-02-11

```
setwd("/Users/user/Desktop/Arm/EE435 R")
#install.packages("quantmod")
#install.packages("fBasics")
#install.packages("sn")
#install.packages("PerformanceAnalytics")
#install.packages("car")
#install.packages("tseries")
#install.packages("forecast")
library(quantmod)
```

```
## Loading required package: xts
```

```
## Loading required package: zoo
```

```
##
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```
## Loading required package: TTR
```

```
## Registered S3 method overwritten by 'quantmod':
##   method            from
##   as.zoo.data.frame zoo
```

```
library(fBasics)
```

```
## Loading required package: timeDate
```

```
## Loading required package: timeSeries
```

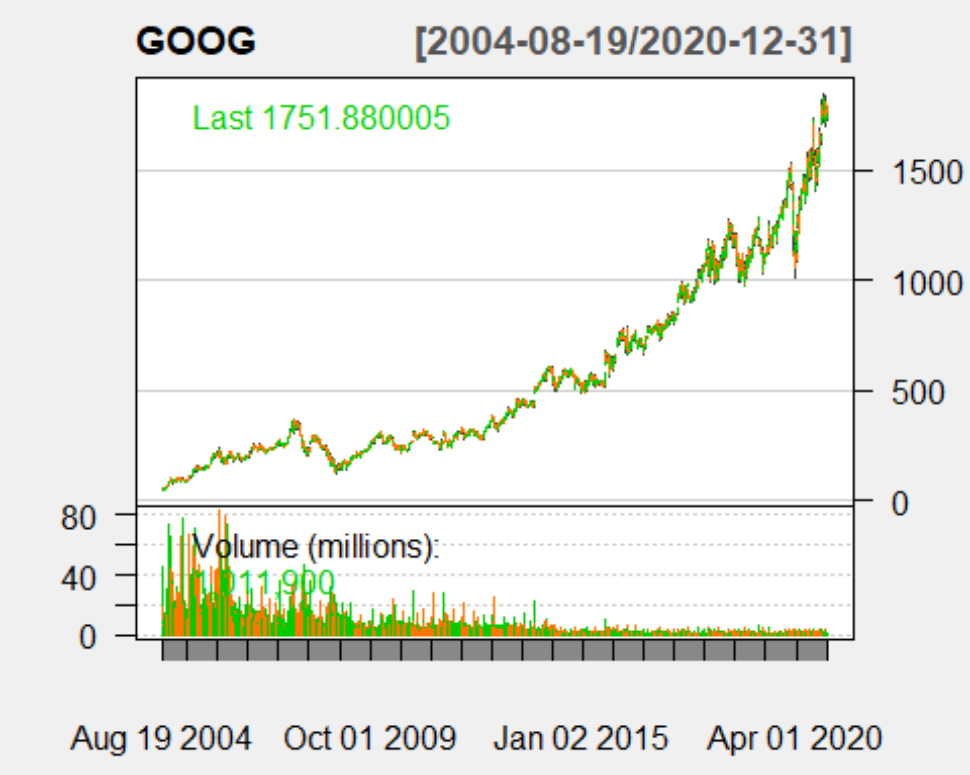
```
##
## Attaching package: 'timeSeries'
```

```
## The following object is masked from 'package:zoo':
##
##     time<-
```

```
##
## Attaching package: 'fBasics'
```

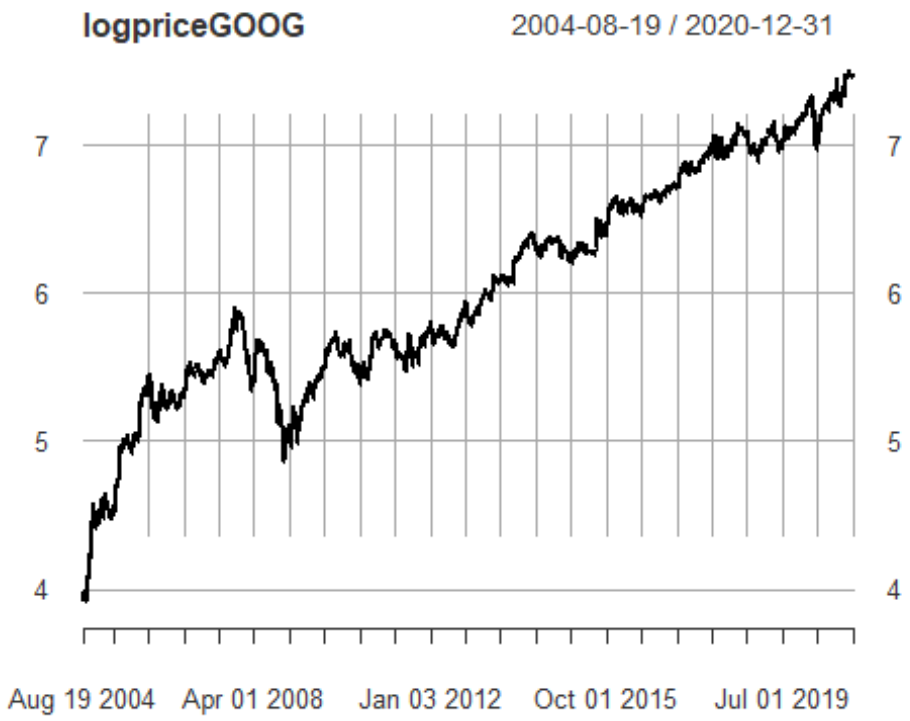
```
## The following object is masked from 'package:TTR':
##
##     volatility

library(sn)

## Loading required package: stats4

##
## Attaching package: 'sn'

## The following object is masked from 'package:fBasics':
##
##     vech

## The following object is masked from 'package:stats':
##
##     sd

library(PerformanceAnalytics)

##
## Attaching package: 'PerformanceAnalytics'

## The following objects are masked from 'package:timeDate':
##
##     kurtosis, skewness

## The following object is masked from 'package:graphics':
##
##     legend

library(car)

## Loading required package: carData

##
## Attaching package: 'car'

## The following object is masked from 'package:fBasics':
##
##     densityPlot

library(tseries)
library(forecast)

getSymbols("GOOG",from="2004-08-19",to="2021-01-01")

## 'getSymbols' currently uses auto.assign=TRUE by default, but will
## use auto.assign=FALSE in 0.5-0. You will still be able to use
## 'loadSymbols' to automatically load data. getOption("getSymbols.env")
## and getOption("getSymbols.auto.assign") will still be checked for
## alternate defaults.
```

```
##
## This message is shown once per session and may be disabled by setting
## options("getSymbols.warning4.0"=FALSE). See ?getSymbols for details.

## [1] "GOOG"

dim(GOOG)

## [1] 4122    6

head(GOOG)

##            GOOG.Open GOOG.High GOOG.Low GOOG.Close GOOG.Volume
GOOG.Adjusted
## 2004-08-19  49.81329  51.83571 47.80083   49.98266    44871361
49.98266
## 2004-08-20  50.31640  54.33633 50.06235   53.95277    22942874
53.95277
## 2004-08-23  55.16822  56.52812 54.32139   54.49574    18342897
54.49574
## 2004-08-24  55.41230  55.59163 51.59162   52.23920    15319808
52.23920
## 2004-08-25  52.28403  53.79835 51.74604   52.80209     9232276
52.80209
## 2004-08-26  52.27905  53.77345 52.13459   53.75352     7128620
53.75352

tail(GOOG)

##            GOOG.Open GOOG.High GOOG.Low GOOG.Close GOOG.Volume
GOOG.Adjusted
## 2020-12-23  1728.110  1747.990 1725.040    1732.38     1033800
1732.38
## 2020-12-24  1735.000  1746.000 1729.110    1738.85      346800
1738.85
## 2020-12-28  1751.635  1790.728 1746.335    1776.09     1393000
1776.09
## 2020-12-29  1787.790  1792.440 1756.090    1758.72     1299400
1758.72
## 2020-12-30  1762.010  1765.095 1725.600    1739.52     1306100
1739.52
## 2020-12-31  1735.420  1758.930 1735.420    1751.88     1011900
1751.88

da=GOOG
chartSeries(GOOG,theme="white")
```

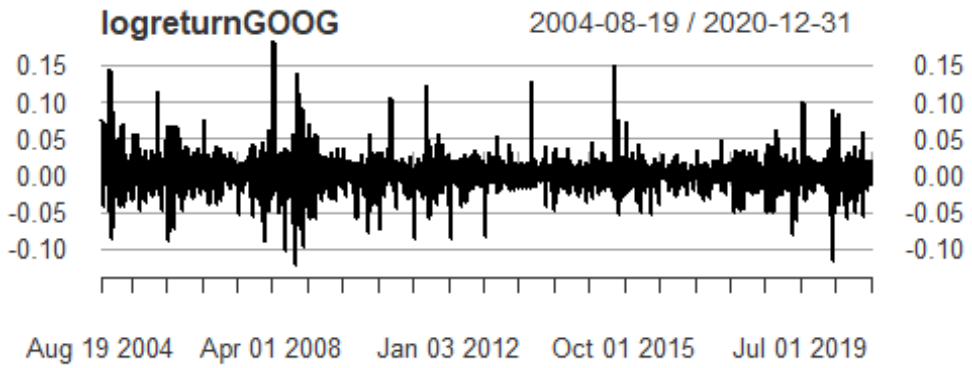


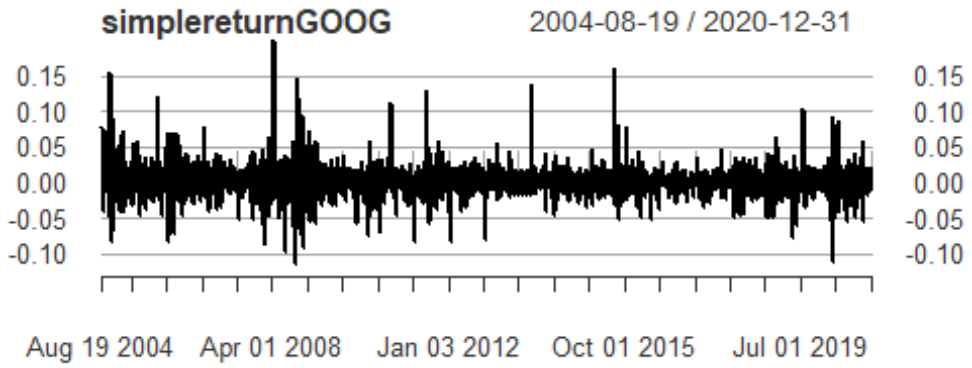

```
priceGOOG=da[,6]
plot(priceGOOG,type='l')
```

```
logpriceGOOG=log(priceGOOG)
plot(logpriceGOOG,type='l')
```

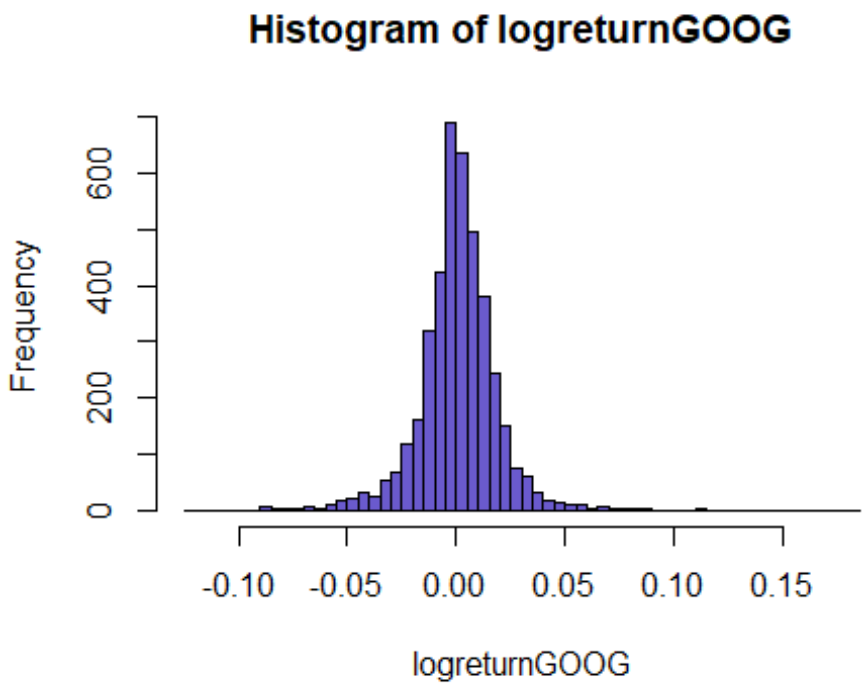



```
logreturnGOOG=diff(log(priceGOOG))
simplereturnGOOG <-exp(logreturnGOOG)-1

par(mfrow=c(2,1))
plot(logreturnGOOG,type='l')
plot(simplereturnGOOG)
```

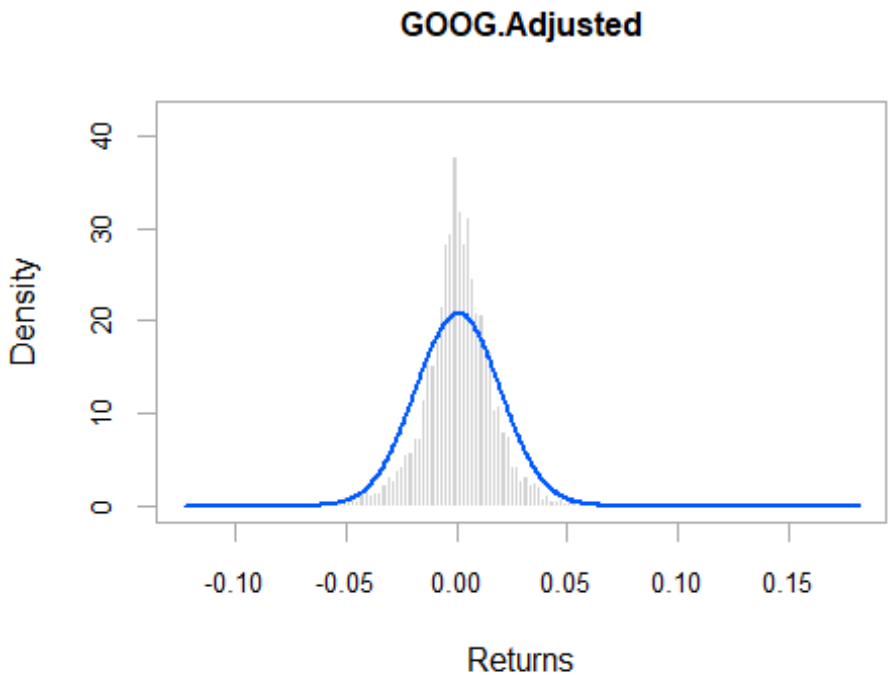





```
newlogreturnGOOG <- logreturnGOOG[2:nrow(logreturnGOOG),]
newsimplereturnGOOG <- simplereturnGOOG[2:nrow(logreturnGOOG),]

#statistics log
par(mfrow=c(1,1))
hist(logreturnGOOG, breaks=100, col="slateblue")
```



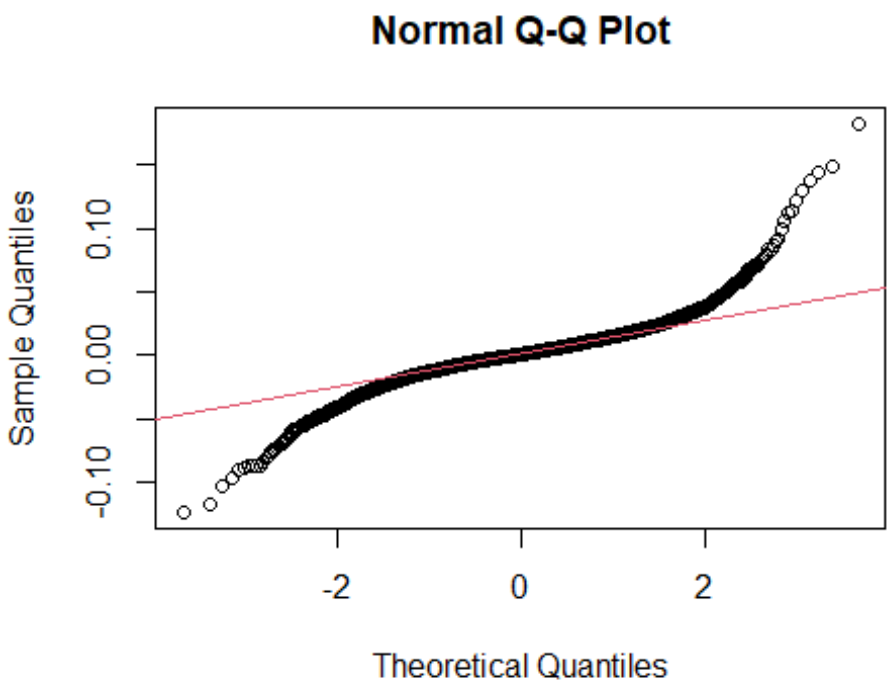

```
chart.Histogram(logreturnGOOG,methods = c("add.normal"))
```




```
table.Stats(logreturnGOOG)
```

```
##                  GOOG.Adjusted
## Observations        4121.0000
## NAs                    1.0000
## Minimum               -0.1234
## Quartile 1            -0.0074
## Median                 0.0007
## Arithmetic Mean        0.0009
## Geometric Mean         0.0007
## Quartile 3             0.0100
## Maximum                0.1823
## SE Mean                0.0003
## LCL Mean (0.95)        0.0003
## UCL Mean (0.95)        0.0014
## Variance               0.0004
## Stdev                  0.0191
## Skewness               0.4528
## Kurtosis               9.1391
```

```
#normal test
par(mfrow=c(1,1))
qqnorm(newlogreturnGOOG)
qqline(newlogreturnGOOG, col = 2)
```




```
jarque.bera.test(newlogreturnGOOG)
```

```
##
##  Jarque Bera Test
```

```
##
## data:  newlogreturnGOOG
## X-squared = 14482, df = 2, p-value < 2.2e-16
```

```
#Test mean
t.test(newlogreturnGOOG)
```

```
## Warning in tstat + c(-cint, cint): Recycling array of length 1 in array-
vector arithmetic is deprecated.
##   Use c() or as.vector() instead.
```

```
## Warning in cint * stderr: Recycling array of length 1 in vector-array
arithmetic is deprecated.
##   Use c() or as.vector() instead.
```

```
##
##  One Sample t-test
##
## data:  newlogreturnGOOG
## t = 2.8957, df = 4120, p-value = 0.003803
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.0002787253 0.0014474425
## sample estimates:
##    mean of x
## 0.0008630839
```

```
#Test Skewness
T=length(newlogreturnGOOG)
m3=skewness(newlogreturnGOOG)
m3
```

```
## [1] 0.4527864
```

```
tst = m3/sqrt(6/T)
tst
```

```
## [1] 11.8664
```

```
pv = 1-pnorm(tst)
pv
```

```
## [1] 0
```

```
#Test excess kurtosis =0
K = kurtosis(newlogreturnGOOG)
tst = K/sqrt(24/T)
tst
```

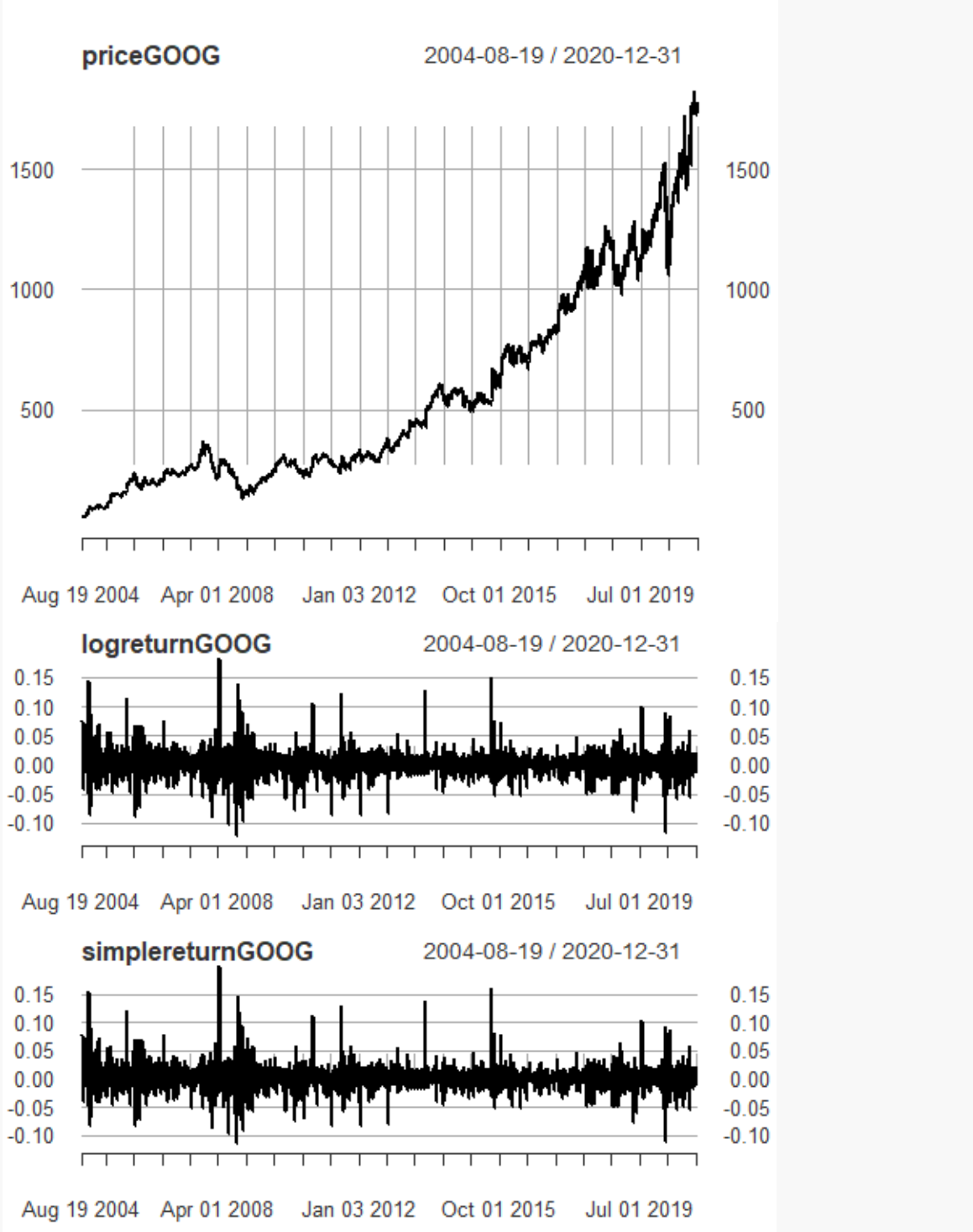
```
## [1] 119.7564
```

```
pv = 2*(1-pnorm(tst))
pv
```

```
## [1] 0
```

Answer to mini-test

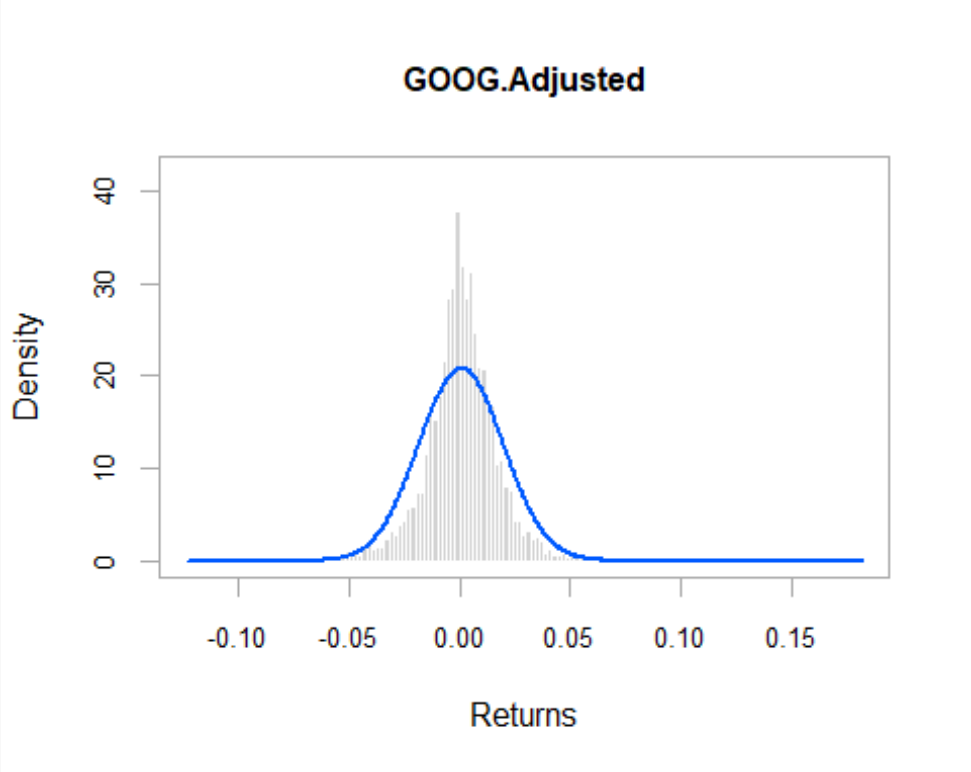
a.



b.

```
##                  GOOG.Adjusted
## Observations         4121.0000
## NAs                     1.0000
## Minimum                -0.1234 = minimum
## Quartile 1             -0.0074
## Median                  0.0007
## Arithmetic Mean         0.0009 = Sample mean
## Geometric Mean          0.0007
## Quartile 3              0.0100
## Maximum                 0.1823 = maximum
## SE Mean                 0.0003
## LCL Mean (0.95)         0.0003
## UCL Mean (0.95)         0.0014
## Variance                0.0004
## Stdev                   0.0191 = Standard deviation
## Skewness                0.4528 = skewness
## Kurtosis                9.1391 = excess kurtosis
```

c.




```
jarque.bera.test(newlogreturnGOOG)
```

```
##
##  Jarque Bera Test
##
## data:  newlogreturnGOOG
## X-squared = 14482, df = 2, p-value < 2.2e-16
```

As p-value is less than 2(magic number), or 1.96. We can reject the H0 which is the return of GOOG is normally distributed. Therefore, we conclude that the return of GOOG is not normally distributed.

d. #Test mean

```
T=length(newlogreturnGOOG)

tst = (0.09-0.8)*T

tst

pv = pnorm(tst)

pv
```

as p value = 0 means we can reject null hypothesis and conclude that the mean is not equal to 0.8

e.
```
##  One Sample t-test
##
## data:  newlogreturnGOOG
## t = 2.8957, df = 4120, p-value = 0.003803
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  0.0002787253 0.0014474425
## sample estimates:
##    mean of x
## 0.0008630839
```

f.H0 : m3 ≤ 0 p2`bmb Ha : m3 > 0

p value is less than 0.5 which conclude that skewness is not 0, no symmetry

g.

also p value is 0 and reject null hypothesis means excess kurtosis is not zero, or kurtosis is not 3.