

FE590. Assignment #1.

2022-02-07

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Date: 02/05/2022

Question 1

Question 1.1

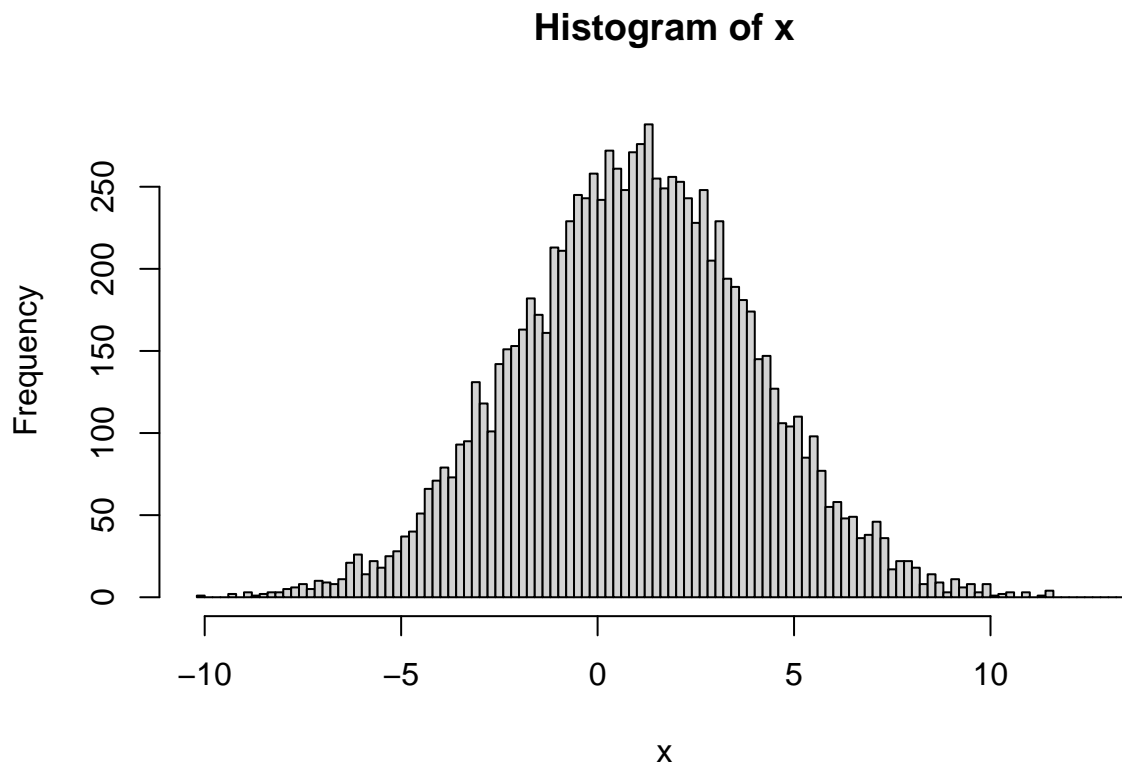
```
CWID = 10479206 #Place here your Campus wide ID number, this will personalize  
#your results, but still maintain the reproduceable nature of using seeds.  
#If you ever need to reset the seed in this assignment, use this as your seed  
#Papers that use -1 as this CWID variable will earn 0's so make sure you change  
#this value before you submit your work.  
personal = CWID %% 10000  
set.seed(personal)
```

Generate a vector `x` containing 10,000 realizations of a random normal variable with mean 1.0 and standard deviation 3.0, and plot a histogram of `x` using 100 bins.

(Note that the following two fields can be added wherever you desire to show a solution. You can use the first for a written response, and the second for showing R code and its output. Some questions will require just one, and some both. I will not always provide you with these, but you can add them at your discretion where necessary. If it makes sense to do the R code first then that's fine. If you want to include multiple of each, that's ok too. Do what you feel is necessary to answer the question fully.)

Solution:

```
#response  
x <- rnorm(10000, mean = 1, sd = 3)  
hist(x, breaks = 100)
```



```
#or
#x <- data.frame(x)
#ggplot(x, aes(x)) +           # ggplot2 histogram with manual bins
#  geom_histogram(bins = 100)
```

Question 1.2

Calculate the mean and standard deviation of these 10000 values. Do your answers make sense?

Solution:

```
# my response
# Yes it does make sense
mean(x)
```

```
## [1] 0.9739028
```

```
sd(x)
```

```
## [1] 3.016422
```

Question 1.3

Using the `sample` function, take out 10 random samples of 500 observations each (with replacement). Create a vector of the means of each sample. Calculate the mean of the sample means and the standard deviation of the sample means. What do you observe about these results?

Solution:

```
# Enter your R code here!
m <- rep(0, 10)
for (i in 1:10) {
  m[i] <- mean(sample(x, 500))
}
Mean <- mean(m)
print(Mean)
```

```
## [1] 0.9920035
```

```
Sd <- sd(m)
print(Sd)
```

```
## [1] 0.09163671
```

```
#the mean is always around 1
#the sd is always around 0.1
```

#Question 2

##Question 2.1

Create a script that creates a vector of the values from 1 to 100 using a for loop.

Solution:

```
# Enter your R code here!
v = NULL
for (num in 1:100){
  v = cbind(v,num)
}
v
```

```
##      num num num num num num num num num num num num num num num num num num
## [1,]  1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18
##      num num num num num num num num num num num num num num num num num num
## [1,] 19  20  21  22  23  24  25  26  27  28  29  30  31  32  33  34  35  36
##      num num num num num num num num num num num num num num num num num num
## [1,] 37  38  39  40  41  42  43  44  45  46  47  48  49  50  51  52  53  54
##      num num num num num num num num num num num num num num num num num num
## [1,] 55  56  57  58  59  60  61  62  63  64  65  66  67  68  69  70  71  72
```

```
##      num num num num num num num num num num num num num num num num num num
## [1,] 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
##      num num num num num num num num num num
## [1,] 91 92 93 94 95 96 97 98 99 100
```

#for your convenient i change the type of output as array

##Question 2.2

Create a script that creates a vector of the first 20 Fibonacci numbers.

Solution:

```
Fibonacci <- numeric(20)
Fibonacci[1] <- Fibonacci[2] <- 1
for (i in 3:20) Fibonacci[i] <- Fibonacci[i - 2] + Fibonacci[i - 1]
print("First 20 Fibonacci numbers:")
```

```
## [1] "First 20 Fibonacci numbers:"
```

```
print(Fibonacci)
```

```
## [1] 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610
## [16] 987 1597 2584 4181 6765
```

Question 3

Download the FinDataAdjCl.csv data set from the Canvas shell, as you'll need it for this assignment

Question 3.1

Load the csv file and use the summary command to analyze three stocks from this data set (your choice which 3)

```
# Enter your R code here!
library(gdata)
FinDataAdjCl <- read.csv("FinDataAdjCl.csv", stringsAsFactors = FALSE)
typeof(FinDataAdjCl$Date)
```

```
## [1] "character"
```

```
summary(FinDataAdjCl[,c(4,5,6)])
```

```
##      BAC      GE      GOOG
## Min.   :10.62 Min.   : 6.701 Min.   : 489.9
## 1st Qu.:14.95 1st Qu.:18.034 1st Qu.: 581.6
## Median :16.57 Median :22.729 Median : 767.0
## Mean   :20.19 Mean   :21.777 Mean    : 802.1
## 3rd Qu.:25.75 3rd Qu.:26.871 3rd Qu.:1017.0
## Max.   :32.37 Max.   :30.051 Max.    :1268.3
```

Question 3.2

Split the data into two pieces, one for the dates from 2015 and earlier and the other for the dates after 2015. Use these subsets to rerun your summary command for each group for the same stocks you used in 3.1

Solution:

```
# Enter your R code here!
```

```
Finsubup <- FinDataAdjCl[1:which(FinDataAdjCl$Date == "1/2/2015"),c(4,5,6)]
Finsubdown <- FinDataAdjCl[(which(FinDataAdjCl$Date == "1/2/2015")+1):nrow(FinDataAdjCl),c(4,5,6)]
summary(Finsubup)
```

```
##      BAC      GE      GOOG
## Min.   :13.55 Min.   :20.61 Min.   :492.7
## 1st Qu.:14.48 1st Qu.:21.86 1st Qu.:532.1
## Median :15.26 Median :22.21 Median :556.9
## Mean   :15.26 Mean   :22.19 Mean   :555.5
## 3rd Qu.:16.04 3rd Qu.:22.56 3rd Qu.:576.0
## Max.   :17.05 Max.   :23.24 Max.   :606.1
```

```
summary(Finsubdown)
```

```
##      BAC      GE      GOOG
## Min.   :10.62 Min.   : 6.701 Min.   : 489.9
## 1st Qu.:15.15 1st Qu.:14.830 1st Qu.: 710.8
## Median :22.01 Median :23.770 Median : 807.9
## Mean   :21.21 Mean   :21.690 Mean   : 853.5
## 3rd Qu.:27.63 3rd Qu.:27.251 3rd Qu.:1039.8
## Max.   :32.37 Max.   :30.051 Max.   :1268.3
```

Question 3.3

What do you see in these results? Are the company's prices changing? Do you think this is just inflation or is it more noticable in one or the other?

Solution:

```
# Enter your R code here!
```

```
#stock GOOG are highly changed. Even GOOG min stock price is 492 which is almost same with
#the price after 2015, but median price and MAX price before 2015 is much lower than price after 2015
```

```
#Question 4
```

```
##Question 4.1
```

Download and use the "fakedataeasy.csv" file found under Modules section of Canvas. Using this data set, find the mean and standard deviation of each of the variables in this data set.

Solution:

```
# Enter your R code here!
library(gdata)
fakedataeasy <- read.csv("fakedataeasy.csv")
fakedataeasy <- as.data.frame(fakedataeasy)

means <- NULL
sds <- NULL
for (i in 1:length(fakedataeasy)) {
  means <- cbind(means, mean(fakedataeasy[,i]))
  sds <- cbind(sds, sd(fakedataeasy[,i]))
}

mat <- as.data.frame(matrix(0,2,5))
row.names(mat) <- c("mean", "sd")
names(mat) <- names(fakedataeasy)

mat[1,] <- means
mat[2,] <- sds
print(mat)
```

```
##           y           x5           x6           x7           x8
## mean 287330.04 9.9887014 62557.630 221.8780 2507.5618
## sd   36017.43 0.4944624 7857.351 219.6931 315.4524
```