LastName Homework 1

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Question 1:

Detective work to decipher an unintelligible function

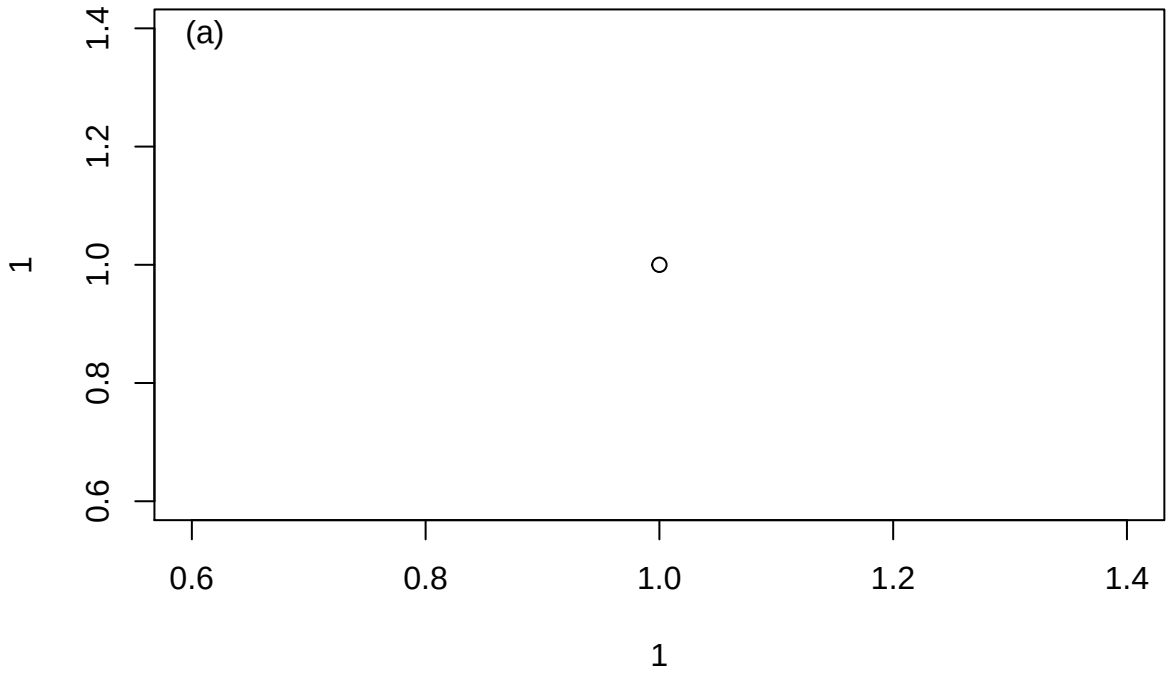
Rewrite the R code so that its purpose can be easily understood. Include:

• comments, • meaningful variable names, • indenting, line spacing, etc.

```
# function to add an inset tag to a plot.
## 'xtrm_coords' defines the max/min x and y values of the plot.
## 'inst_lab' is the text label you want to appear for the inset.
## 'injst' is a vector of the adjustment for the label inside the plot. The first item shifts the label
## the function scales the adjustment specified in injst to the plot, creating the two variables 'x_loc

inst_fxn <- function(inst_lab, injst, ...){
  xtrm_coords <- par("usr")
  x_loc <- xtrm_coords[1] + injst[1]*diff(xtrm_coords[1:2])
  y_loc <- xtrm_coords[3] + injst[2]*diff(xtrm_coords[3:4])
  text(x=x_loc, y=y_loc, l=inst_lab, ...)
}

# make a plot
plot(1,1)
# run the function to insert the inset label
inst_fxn(inst_lab= "(a)", injst= c(.05,.95))
```



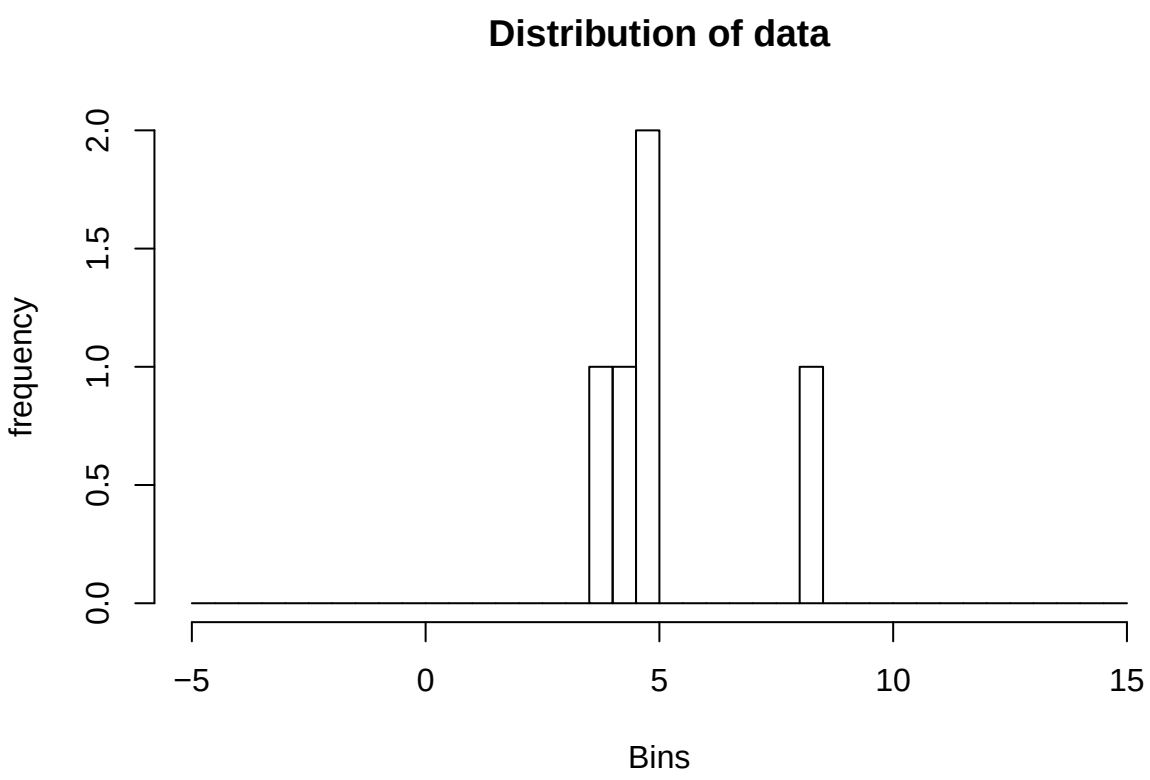
Question 2: Central Limit Theorem ## 2a. Write the function! ### Write a function named CL.theorem() that takes four parameters (i.e., arguments): n, mean, sd, breaks. ### The function will draw n numbers from a random normal distribution with a mean of mean, and a standard deviation of sd. The function will then plot a histogram of the resulting values with the breaks specified by the breaks parameter. The function will also return a list of the following named elements: • a vector of the randomly drawn numbers; name this element data • n; name this element n_data • the mean of the n randomly drawn numbers; name this element mean • the standard deviation of the n randomly drawn numbers; name this element sd

Use the following code to test your function:

```
CL.theorem <- function(n, mean=5, sd=2, breaks=seq(from=-5,to=15,by=0.5)){
  distrib <- rnorm(n, mean, sd)
  histz <- hist(distrib, breaks=breaks,
                xlab='Bins', ylab='frequency', main= 'Distribution of data')

  return(list(histz, data= distrib, n_data= n, mean= mean(distrib), sd= sd(distrib)))
}

q1 <- CL.theorem(n=5, mean=5, sd=2, breaks=seq(from=-5,to=15,by=0.5))
```




```
q1$data
```

```
## [1] 3.857924 8.073443 4.774425 4.616464 4.335272
```

```
q1$n_data
```

```
## [1] 5
```

```
q1$mean
```

```
## [1] 5.131505
```

```
q1$sd
```

```
## [1] 1.681054
```

2b. Make multiple plots!

Use the pdf() function for this question. Now, open a pdf file for output to store the plots, and call the function 10 times with the same values for mean, sd, breaks, but with different values for n, as follows: n=5, 10, 20, 30, 50, 100, 500, 1000, 5000, 10000. Then close the pdf file. The result should be a single pdf file containing 10 plots.

```
n_lst <- c(5, 10, 20, 30, 50, 100, 500, 1000, 5000, 10000)

pdf(file='ten_plots')

try_for_loop <- for(i in 1:length(n_lst)){
  CL.theorem(n_lst[i], mean=5, sd=2, breaks=seq(from=-5,to=15,by=0.5))
}

dev.off()
```

```
## pdf
##   2
```

2c. Remember the apply() family?

Solve question 2b using the apply() function (i.e., open a pdf file, use the apply() function, close the pdf file).

```
pdf(file='ten_plots_sapply')

try_apply <- sapply(X=n_lst, FUN=CL.theorem)

dev.off()
```

```
## pdf
##   2
```