**R Code for Examples in the book**



***“Statistics: The Art and Science of Learning from Data”***

**by Agresti, Franklin and Klingenberg, 5th edition**

**Chapter 8**

**Example 13: Carbon Footprint – Confidence Interval for the Correlation**

## Reading in the data:

sandwiches <- read.csv(file='https://raw.githubusercontent.com/artofstat/data/master/Chapter7/carbon\_footprint\_sandwich.csv')  
attach(sandwiches) # so we can refer to variable names

## To compute the correlation coefficient between carbon footprint and energy content

cor(EnergyContent..kCal., Carbon.footprint..g.CO2.eq..)

## [1] 0.6208991

## To obtain a bootstrap sample of the sandwiches

sample(Sandwich, replace = TRUE)

## [1] "Egg, Bacon" "Egg, Bacon" "Sausage, Brown Sauce"  
## [4] "Ham, Mayo" "Ham, Mustard" "Chicken Salad"   
## [7] "Cheese, Pickle" "Cheese Ploughman " "Ham, Mustard"   
## [10] "Ham, Mustard" "Ham, Mayo" "Sausage, Brown Sauce"  
## [13] "Chicken, Stuffing" "Chicken Salad" "Tuna, Cucumber"   
## [16] "Cheese, Mayo" "Ham, Mustard" "Ham, Egg"   
## [19] "Egg, Rocket" "Chicken Salad" "Ham, Mustard"   
## [22] "Breakfast" "Chicken, Bacon" "Breakfast"

## 

## To obtain a bootstrap sample of the rows of the dataframe, you can use sandwiches[sample(seq\_len(nrow(sandwiches)), replace = TRUE), ]

## To generate 10,000 bootstrap samples and find the correlation

bootcorr <- c() # initializing  
for (i in 1:10000) {  
 bootsample <- sandwiches[sample(seq\_len(nrow(sandwiches)),   
 replace = TRUE), ]  
 bootcorr[i] <- cor(bootsample$EnergyContent..kCal.,   
 bootsample$Carbon.footprint..g.CO2.eq..)  
}

## To obtain summary of the correlation coefficients from the bootstrap samples

quantile(bootcorr, c(0.025, 0.975))

## 2.5% 97.5%   
## 0.2478260 0.8384972