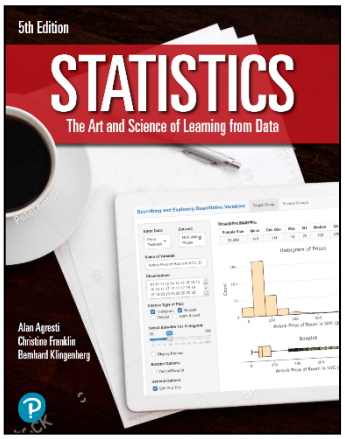

R Code for Examples in the book
"Statistics: The Art and Science of Learning from Data"
by Agresti, Franklin and Klingenberg, 5th edition

Chapter 12

Example 15: Maximum Bench Press – Confidence and Prediction Intervals

Reading in data

```
athletes <-
read.csv(file='https://raw.githubusercontent.com/artofstat/data/master/Chapter12/highschool_female_athletes.csv')
colnames(athletes) #check column names
```

```
##  [1] "Athlete"             "BP60"                "maxBP..lbs."
##  [4] "LP200"               "maxLP..lbs."         "Situps..per.minute."
##  [7] "X40YD..sec."         "VerticalJump..in."   "SitReach..in."
## [10] "MB..in."             "SR..sec."            "Age"
## [13] "Height..in."         "Weight..lbs."        "Bodyfat...."
## [16] "BMI"                 "Sport"
```

Fitting regression model

```
linReg <- lm(maxBP..lbs. ~ BP60, data = athletes)
summary(linReg)
```

```
##
## Call:
## lm(formula = maxBP..lbs. ~ BP60, data = athletes)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -17.9205  -5.9027  -0.7237   5.4989  19.0973
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  63.5369     1.9565  32.475  < 2e-16 ***
## BP60          1.4911     0.1497   9.958 6.48e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 8.003 on 55 degrees of freedom
## Multiple R-squared:  0.6432, Adjusted R-squared:  0.6368
## F-statistic: 99.17 on 1 and 55 DF,  p-value: 6.481e-14
```

To find a 95% confidence for the population mean for x = 11

```
predict(linReg, newdata = data.frame(BP60 = 11),
        interval='confidence', se.fit = TRUE)

## $fit
##        fit      lwr      upr
## 1 79.93844 77.81405 82.06283
##
## $se.fit
## [1] 1.060051
##
## $df
## [1] 55
##
## $residual.scale
## [1] 8.003188
```

To find a 95% prediction interval for a single observation of x = 11

```
predict(linReg, newdata = data.frame(BP60 = 11),
        interval='prediction')

##        fit      lwr      upr
## 1 79.93844 63.75961 96.11727
```