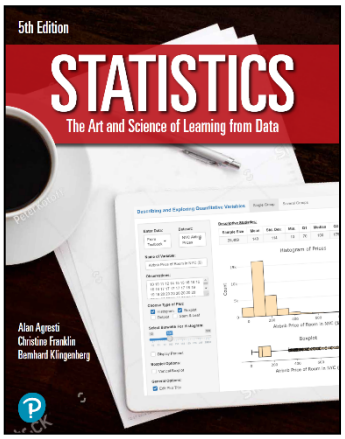


R Code for Examples in the book
"Statistics: The Art and Science of Learning from Data"
by Agresti, Franklin and Klingenberg, 5th edition

Chapter 3

Example 12: Olympic High Jumps – Exploring Multivariate Relationships

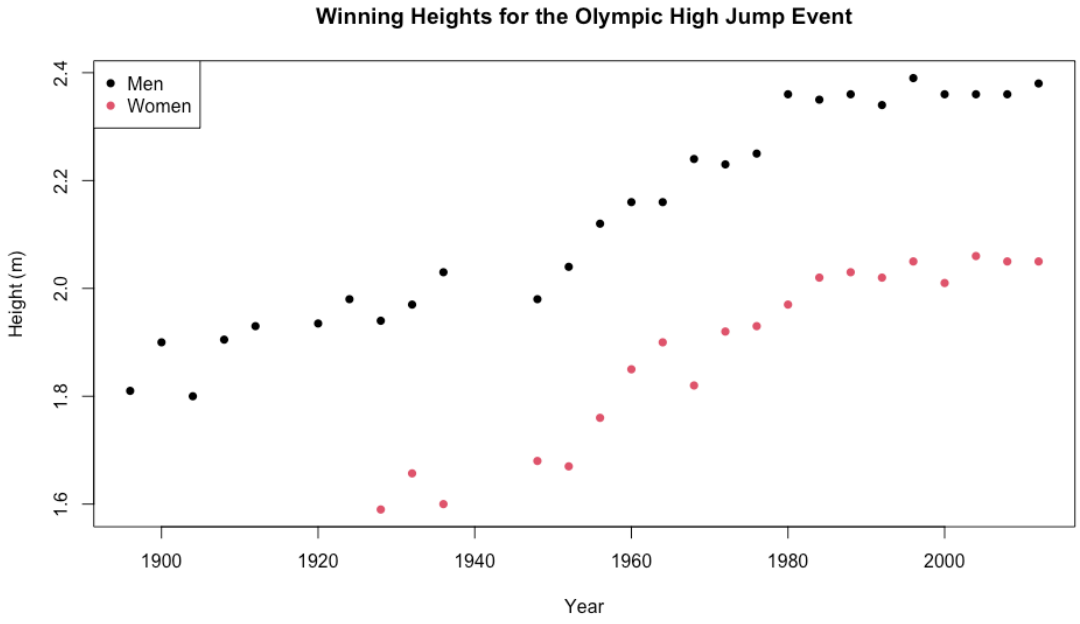
Reading in the data

```
heights <-
read.csv(file='https://raw.githubusercontent.com/artofstat/data/master/Chapter3/high_jump.csv')
attach(heights) # so we can refer to variable names
```

Basic scatterplot

```
plot(x = Year, y = Winning.Height..m., pch = 16,
     col = factor(Gender),
     main = 'Winning Heights for the Olympic High Jump Event',
     xlab = 'Year', ylab = 'Height (m)')

legend("topleft",
       legend = levels(factor(Gender)),
       pch = 16,
       col = factor(levels(factor(Gender))))
```



Separating observations for men and women

```
menObservations <- subset(heights, Gender == 'Men')
womenObservations <- subset(heights, Gender == 'Women')
```

Fitting in regression model for observations for men and women

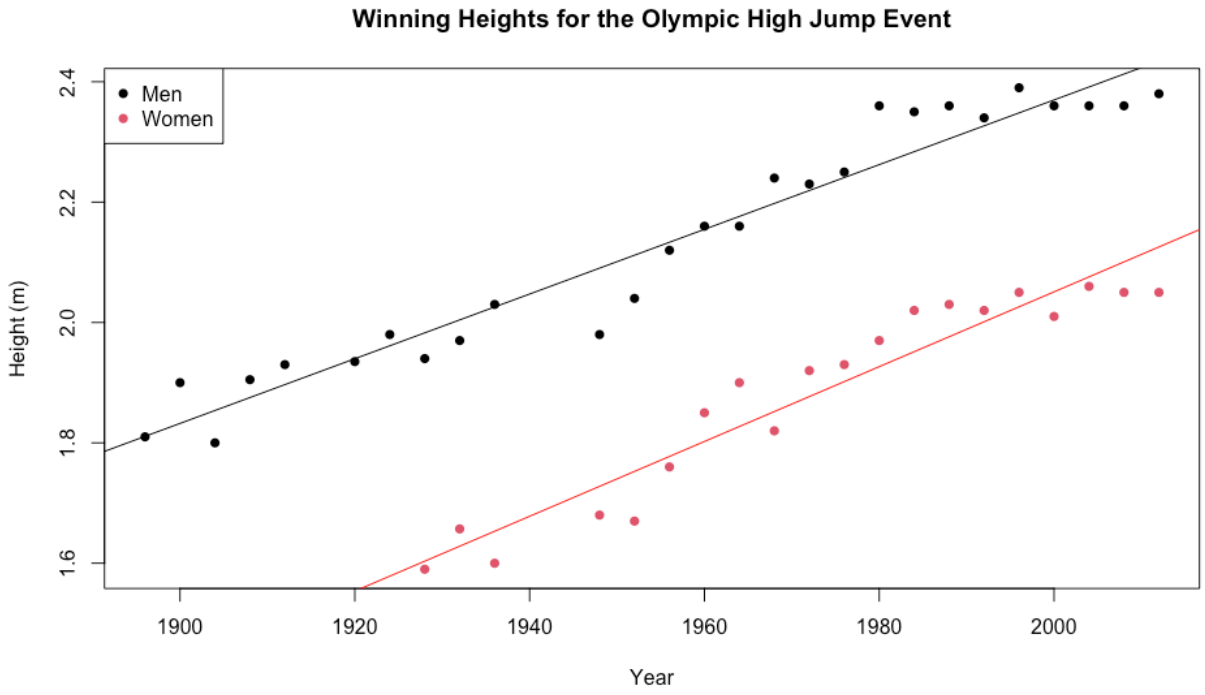
```
lmMen <- lm(Winning.Height..m. ~ Year, data = menObservations)
lmWomen <- lm(Winning.Height..m. ~ Year, data = womenObservations)
```

Adding the regression equations to the plot

```
plot(x = Year, y = Winning.Height..m., pch = 16,
     col = factor(Gender),
     main = 'Winning Heights for the Olympic High Jump Event',
     xlab = 'Year', ylab = 'Height (m)')

legend("topleft",
       legend = levels(factor(Gender)),
       pch = 16,
       col = factor(levels(factor(Gender))))

abline(lmMen, col = 'black')
abline(lmWomen, col = 'red')
```



Scatterplot using ggplot2

```
library(ggplot2)
ggplot(heights,
       aes(x = Year, y = Winning.Height..m.)) +
  geom_point(aes(shape = Gender, color = Gender)) +
  geom_smooth(method=lm, se=FALSE, fullrange= TRUE,
              aes(color=Gender)) +
  labs(title = 'Winning Heights for the Olympic High Jump Event',
       x = 'Year', y = 'Height (m)') +
  theme_bw() +
  scale_x_continuous(limits = c(1890,2030), breaks = seq(1900,2020,20))
```