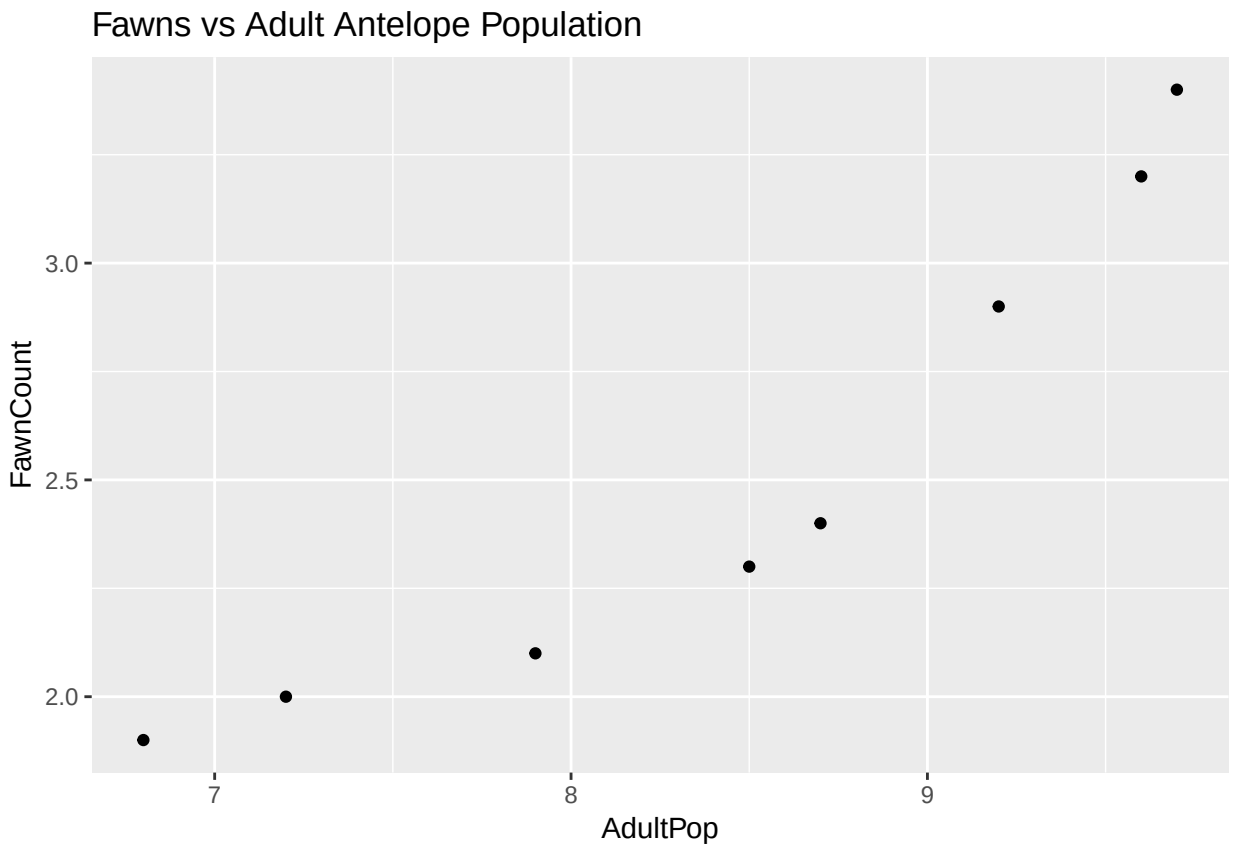
Holden Herrell IST687 HW8

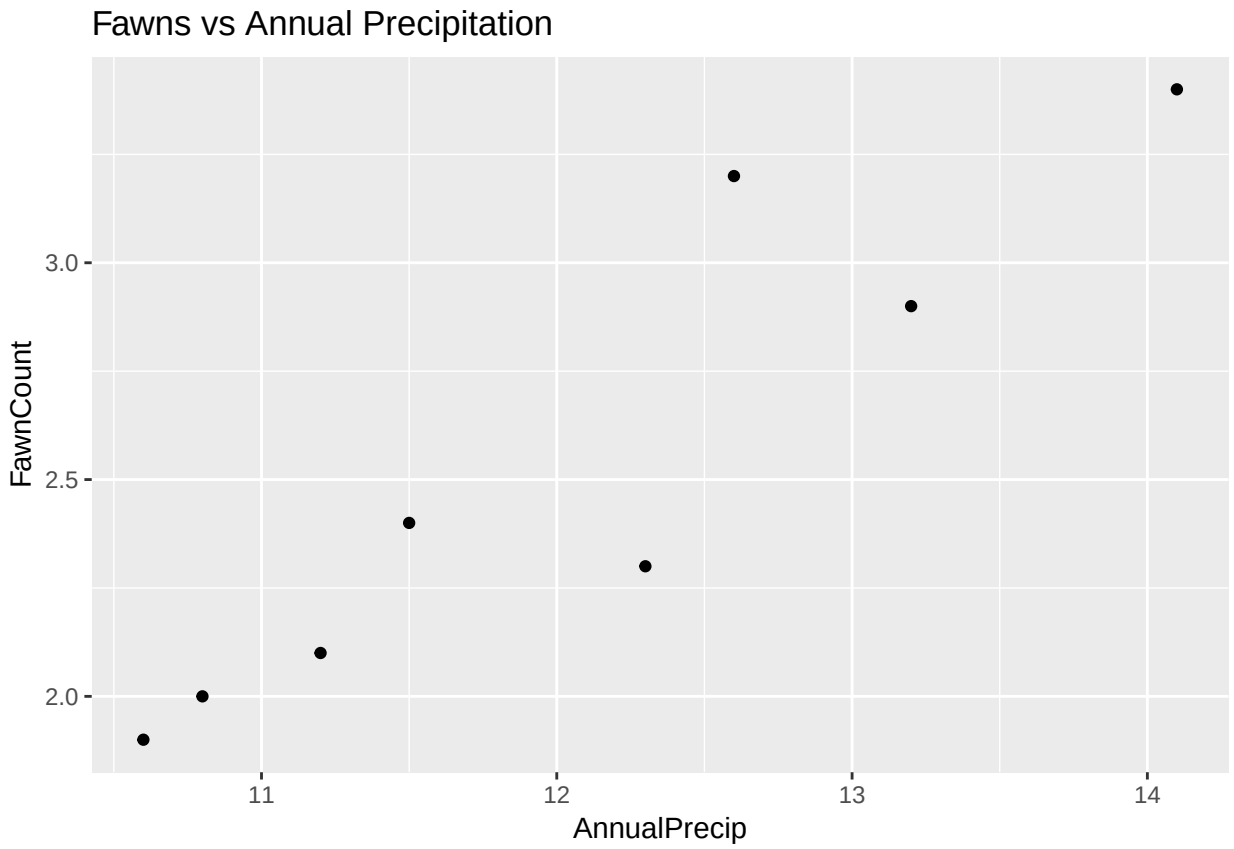
```
#Step 1-2
Data<-read.xls("http://college.cengage.com/mathematics/brase/understandable_statistics/7e/students/datasets/mlr/excel/mlr01.xls")
colnames(Data)<-c("FawnCount","AdultPop","AnnualPrecip","WinterSeverity")
#Step 3
str(Data)
```

```
## 'data.frame':    8 obs. of  4 variables:
##  $ FawnCount     : num  2.9 2.4 2 2.3 3.2 ...
##  $ AdultPop      : num  9.2 8.7 7.2 8.5 9.6 ...
##  $ AnnualPrecip  : num  13.2 11.5 10.8 12.3 12.6 ...
##  $ WinterSeverity: int  2 3 4 2 3 5 1 3
```

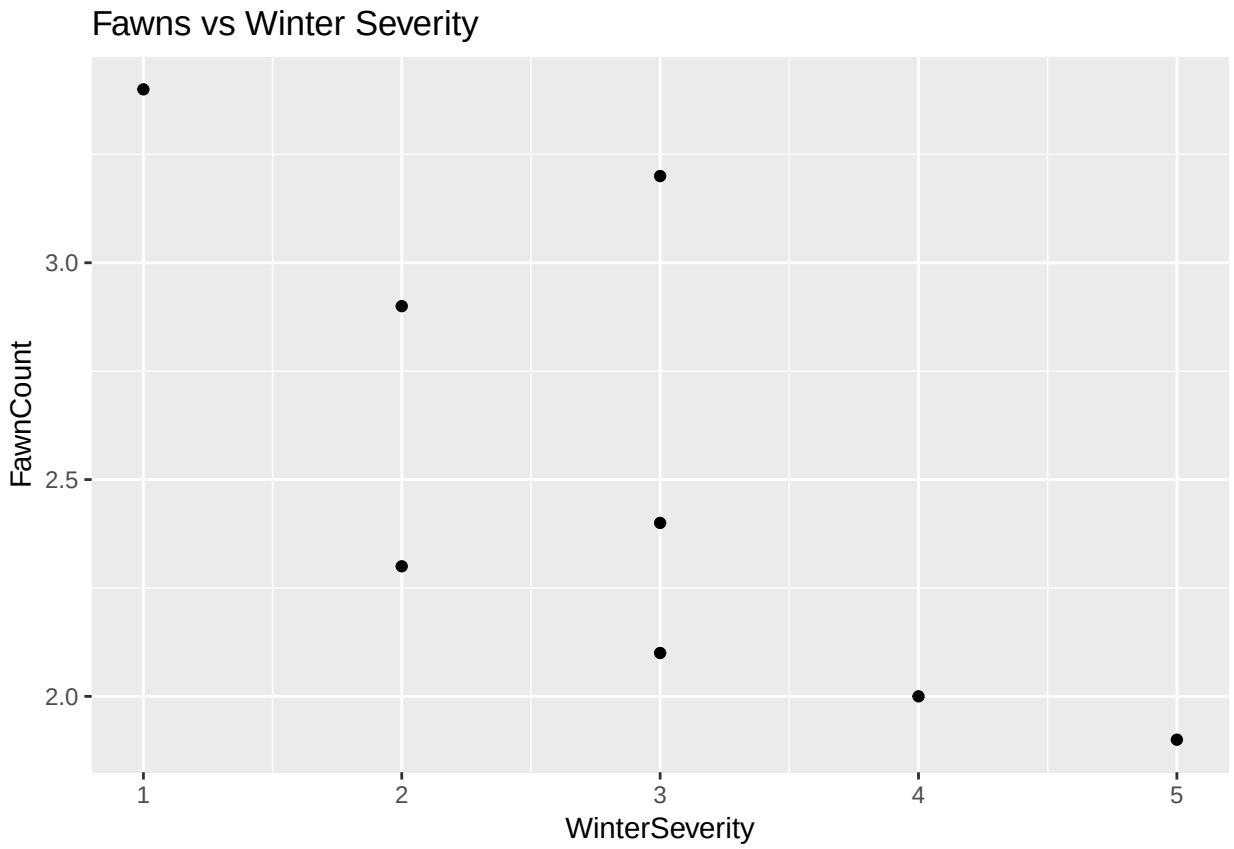
```
#Step 4
Plot1<-ggplot(Data,aes(x=AdultPop, y=FawnCount))+geom_point()+ggtitle("Fawns vs Adult Antelope Population")
Plot1
```



```
Plot2<-ggplot(Data,aes(x=AnnualPrecip, y=FawnCount))+geom_point()+ggtitle("Fawns vs Annual Precipitation")
Plot2
```



```
Plot3<-ggplot(Data,aes(x=WinterSeverity, y=FawnCount))+geom_point()+ggtitle("Fawns vs Winter Severity")
Plot3
```



```r
#Step 5
#Model 1
m1<-lm(Data$FawnCount ~ Data$WinterSeverity, data=Data)
summary(m1)
```

```
##
## Call:
## lm(formula = Data$FawnCount ~ Data$WinterSeverity, data = Data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.52069 -0.20431 -0.00172  0.13017  0.71724
##
## Coefficients:
##                     Estimate Std. Error t value Pr(>|t|)
## (Intercept)           3.4966     0.3904   8.957 0.000108 ***
## Data$WinterSeverity  -0.3379     0.1258  -2.686 0.036263 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.415 on 6 degrees of freedom
## Multiple R-squared:  0.5459, Adjusted R-squared:  0.4702
## F-statistic: 7.213 on 1 and 6 DF,  p-value: 0.03626
```

```r
#Model 2
m2<-lm(Data$FawnCount ~ Data$WinterSeverity+Data$AnnualPrecip, data=Data)
summary(m2)
```

```
##
## Call:
## lm(formula = Data$FawnCount ~ Data$WinterSeverity + Data$AnnualPrecip,
##     data = Data)
##
## Residuals:
##         1         2         3         4         5         6         7
## -0.165458  0.188313  0.006417 -0.193358  0.289080 -0.193312 -0.010695
##         8
##  0.079013
##
## Coefficients:
##                     Estimate Std. Error t value Pr(>|t|)
## (Intercept)          -5.7791     2.2139  -2.610  0.04765 *
## Data$WinterSeverity   0.2269     0.1490   1.522  0.18842
## Data$AnnualPrecip     0.6357     0.1511   4.207  0.00843 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2133 on 5 degrees of freedom
## Multiple R-squared:    0.9,  Adjusted R-squared:   0.86
## F-statistic: 22.49 on 2 and 5 DF,  p-value: 0.003164
```

```r
#Model 3
m3<-lm(Data$FawnCount ~ Data$WinterSeverity+Data$AnnualPrecip+Data$AdultPop, data=Data)
summary(m3)
```

```
##
## Call:
## lm(formula = Data$FawnCount ~ Data$WinterSeverity + Data$AnnualPrecip +
##     Data$AdultPop, data = Data)
##
## Residuals:
##        1        2        3        4        5        6        7        8
## -0.11533 -0.02661  0.09882 -0.11723  0.02734 -0.04854  0.11715  0.06441
##
## Coefficients:
##                     Estimate Std. Error t value Pr(>|t|)
## (Intercept)         -5.92201    1.25562  -4.716   0.0092 **
## Data$WinterSeverity  0.26295    0.08514   3.089   0.0366 *
## Data$AnnualPrecip    0.40150    0.10990   3.653   0.0217 *
## Data$AdultPop        0.33822    0.09947   3.400   0.0273 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1209 on 4 degrees of freedom
## Multiple R-squared:  0.9743, Adjusted R-squared:  0.955
## F-statistic: 50.52 on 3 and 4 DF,  p-value: 0.001229
```

```r
#Model 3 works best because it explains ~95% of the variation in Fawn Count.
#In Model 1, Winter Severity is significant.
#In Model 2, Annual Precipitation is significant.
#In Model 3, Winter Severity, Annual Precipitation, and Adult Population were significant.
#I would use the Adult Population to predict Fawn Count (see below).
m4<-lm(Data$FawnCount ~ Data$AdultPop, data=Data)
summary(m4)
```

```
##
## Call:
## lm(formula = Data$FawnCount ~ Data$AdultPop, data = Data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.24988 -0.17586  0.04938  0.12611  0.25309
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -1.67914    0.63422  -2.648 0.038152 *
## Data$AdultPop  0.49753    0.07453   6.676 0.000547 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2121 on 6 degrees of freedom
## Multiple R-squared:  0.8813, Adjusted R-squared:  0.8616
## F-statistic: 44.56 on 1 and 6 DF,  p-value: 0.0005471
```