Section 2.1 Inference for Regression

Load needed package.

```
library(Stat2Data)
```

Create a dataframe for **AccordPrice** and look at the structure of the data.

```
data("AccordPrice")
str(AccordPrice)
```

```
## 'data.frame':    30 obs. of  3 variables:
##  $ Age    : int  7 4 4 7 9 1 18 2 2 5 ...
##  $ Price  : num  12 17.9 15.7 12.5 9.5 21.5 3.5 22.8 26.8 13.6 ...
##  $ Mileage: num  74.9 53 79.1 50.1 62 4.8 89.4 20.8 4.8 48.3 ...
```

Find the least-squares regression line.

```
regmodel=lm(Price~Mileage, data=AccordPrice)
summary(regmodel)
```

```
##
## Call:
## lm(formula = Price ~ Mileage, data = AccordPrice)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.5984 -1.8169 -0.4148  1.4502  6.5655
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  20.8096     0.9529   21.84  < 2e-16 ***
## Mileage      -0.1198     0.0141   -8.50 3.06e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.085 on 28 degrees of freedom
## Multiple R-squared:  0.7207, Adjusted R-squared:  0.7107
## F-statistic: 72.25 on 1 and 28 DF,  p-value: 3.055e-09
```

EXAMPLE 2.1 Confidence interval for slope in the model for Accord prices

The confidence interval for the slope can be found with one simple function, confint().

```
confint(regmodel)
```

```
##                  2.5 %      97.5 %
## (Intercept) 18.8577657 22.76146004
## Mileage     -0.1486848 -0.09093915
```

Alternative Solution

Some users may want to get familiar with extracting the values from the regmodel object and using the qt function to do this the long way.

```
beta1hat=regmodel$coefficients[2]
print(unname(beta1hat))
```

```
## [1] -0.1198119
```

```
sebeta1hat=coef(summary(regmodel))[, "Std. Error"][2]
print(unname(sebeta1hat))
```

```
## [1] 0.01409525
```

```
lcl=beta1hat-qt(.975, regmodel$df.residual)*sebeta1hat
ucl=beta1hat+qt(.975, regmodel$df.residual)*sebeta1hat
print(unname(c(lcl, ucl)))
```

```
## [1] -0.14868475 -0.09093915
```