R Lab 4

Carl Conti

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```
GPA <- read.delim("GPA.txt")
fit <- lm(GPA ~ ACT, data=GPA)
fit2 <- lm(GPA ~ ACT + Major, data=GPA)
anova(fit)
```

```
## Analysis of Variance Table
##
## Response: GPA
##            Df Sum Sq Mean Sq F value   Pr(>F)
## ACT         1  3.588  3.5878  9.2402 0.002917 **
## Residuals 118 45.818  0.3883
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

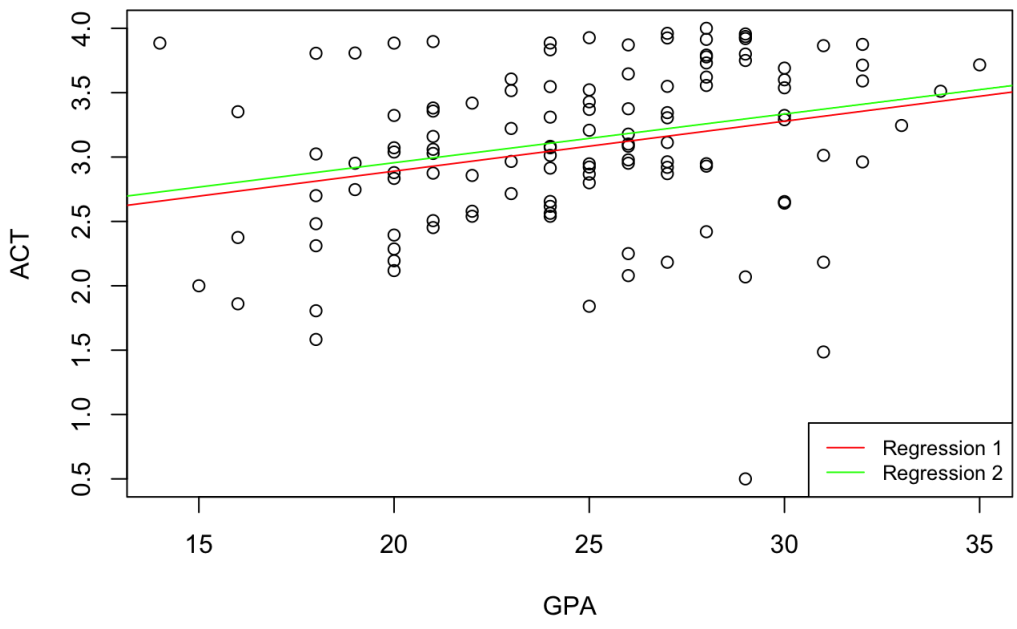
```
anova(fit2)
```

```
## Analysis of Variance Table
##
## Response: GPA
##            Df Sum Sq Mean Sq F value   Pr(>F)
## ACT         1  3.588  3.5878  9.2103 0.002966 **
## Major       1  0.241  0.2407  0.6179 0.433406
## Residuals 117 45.577  0.3895
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
plot(GPA$ACT, GPA$GPA, xlab = "GPA", ylab = "ACT")
abline(fit, col="red")
abline(fit2, col="green")
```

```
## Warning in abline(fit2, col = "green"): only using the first two of 3
## regression coefficients
```

```
legend("bottomright",legend=c("Regression 1", "Regression 2"), col=c("red", "green"), lty=1, cex=0.8)
```



```
f_star <- qf(0.95,1,118)
f_star
```

```
## [1] 3.921478
```

```
f_star_anova <- 0.6179
f_star_anova
```

```
## [1] 0.6179
```

1. E(Y) = 3.588*ACT + 45.577 when Major = 0

E(Y) = 3.588*ACT* + *0.241*GPA + 45.577 when Major = 1

3. The declaration of a mjor is associated with an average increase of 0.241 in GPA holding ACT constant

4. H0: B2 = 0, H1: B2 != 0.

F_star is F(0.95,1,118) = 3.921 but from the ANOVA table we see that F_star is 0.6179. From this we can fail to reject H0 because F_star < F_star from the ANOVA table and we do drop Major from the regression equation.