HW2_631

Prashan Welipitiya

2/13/2020

Exercise 1

    a.

```r
data1 = read.table("http://www.stat.umn.edu/~gary/book/fcdae.data/ex3.1",header=TRUE)
# data1

mu = mean(data1$y)
mu1 = mean(data1[which(data1$diet==1),]$y)
mu2 = mean(data1[which(data1$diet==2),]$y)
mu3 = mean(data1[which(data1$diet==3),]$y)
mu4 = mean(data1[which(data1$diet==4),]$y)
a1 = mu1 - mu
a2 = mu2 - mu
a3 = mu3 - mu
a4 = mu4 - mu

# Overall mean
mu
```

```
## [1] 3.718276
```

```r
# treatment effects
a1
```

```
## [1] 0.02743842
```

```r
a2
```

```
## [1] -0.1382759
```

```r
a3
```

```
## [1] -0.1199425
```

```r
a4
```

```
## [1] 0.2042241
```

    b. $H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = 0$
        $H_A : \alpha_i \neq \alpha_j$ for at least for at least one pair (i,j).

```
data1$fdiet = as.factor(data1$diet)
#  head(data1)
# summary(data1)
full.model<-aov(y~fdiet,data=data1)
anova(full.model)
```

```
## Analysis of Variance Table
##
## Response: y
##           Df  Sum Sq  Mean Sq F value  Pr(>F)
## fdiet      3 0.57821 0.192736  4.6581 0.01016 *
## Residuals 25 1.03440 0.041376
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Because the p value is less than 0.05 and the F value is greater than 1, we reject the null hypothesis and conclude that the data supports the claim that the group means are different.

Exercise 3.

```
data2 = read.table("http://www.stat.umn.edu/~gary/book/fcdae.data/ex3.3",header=TRUE)
# data2
```

$H_0 : \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = 0$
$H_A : \alpha_i \neq \alpha_j$ for at least for at least one pair (i,j).

```
data2$ftrt = as.factor(data2$trt)
# head(data1)
# summary(data1)
full.model<-aov(mc~ftrt,data=data2)
anova(full.model)
```

```
## Analysis of Variance Table
##
## Response: mc
##           Df Sum Sq Mean Sq F value Pr(>F)
## ftrt       3  36.18   12.06  0.9926  0.444
## Residuals  8  97.20   12.15
```

Both the F value is close to 1 and the p value is greater than 0.05 so we fail to reject the null hypothesis.