Module 2 Lab Submission

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We continue our made-up example from last time, where we have three different nutritional supplements (A, B, and C are the group labels), and we are interested in how these supplements affect sleep duration. We randomly assign 15, 20, and 30 people to the supplements, respectively (so 15 to group A, 20 to group B, and 30 to group C). We record the number of hours that each person sleeps during one night after a week of taking their assigned supplement.

We will use the same code as we used in the Module 1 Lab to simulate the data.

```
set.seed(2881)

group_sizes <- c(15, 20, 30)
group_means <- c(8, 8, 8)
group_sds <- c(1, 2, 3)

group1 <- rnorm(group_sizes[1], group_means[1], group_sds[1])
group2 <- rnorm(group_sizes[2], group_means[2], group_sds[2])
group3 <- rnorm(group_sizes[3], group_means[3], group_sds[3])

sleepData <- data.frame(Sleep=c(group1, group2, group3),
                        Group=rep(c('A', 'B', 'C'), group_sizes))

head(sleepData)
```

```
##      Sleep Group
## 1 8.281356     A
## 2 7.993048     A
## 3 8.672573     A
## 4 7.805599     A
## 5 8.903858     A
## 6 8.251239     A
```

Write code in the chunks below to answer the following questions:

- **Perform pair-wise tests comparing each pair of groups, and store the resulting p-values. What are the raw p-values?**

```
OneTwo <- t.test(group1, group2)$p.val
OneThree <- t.test(group1, group3)$p.val
TwoThree <- t.test(group2, group3)$p.val

pvals <- c(OneTwo,OneThree,TwoThree)

print('Pvalues:')
```

```
## [1] "Pvalues:"
```

```
pvals
```

```
## [1] 0.05065559 0.02195134 0.43841132
```

- **Adjust the p-values from the t-tests above using the Bonferroni correction:**

```
adjusted <- p.adjust(pvals, method = 'bonferroni')
adjusted
```

```
## [1] 0.15196676 0.06585403 1.00000000
```

- **Use Tukey's HSD to construct simultaneous confidence intervals for the pairwise comparisons:**

```
fit <- aov(Sleep ~ Group, data = sleepData)

TukeyHSD(fit)
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = Sleep ~ Group, data = sleepData)
##
## $Group
##           diff       lwr       upr     p adj
## B-A -0.9244497 -2.846330 0.9974308 0.4843560
## C-A -1.4548721 -3.234188 0.3244435 0.1299292
## C-B -0.5304224 -2.154708 1.0938631 0.7141057
```