Week 7 Lab

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Packages

We will need the following package for this lab:

```
library(car)
```

```
Loading required package: carData
```

Data

For this lab, we will be using the data set `chickwts`. Take some time to get familiar with the data set using the help function.

```
?chickwts
```

Problem 1

Using the data set `chickwts`, test to see if there is any significant difference between the average `weight` of of chicks based on the factors `feed`. Use a significance level of 0.05

Conduct the test.

```
output <- aov(weight ~ feed, data = chickwts)
```

Check the normality assumption.

```
shapiro.test(output$residuals)
```

```

    Shapiro-Wilk normality test

data:  output$residuals
W = 0.98616, p-value = 0.6272
```

Check the equal variance assumption.

```
leveneTest(output)
```

```
Levene's Test for Homogeneity of Variance (center = median)
      Df F value Pr(>F)
group  5  0.7493 0.5896
      65
```

Check the independence assumption.

```
set.seed(1)
durbinWatsonTest(output)
```

```
 lag Autocorrelation D-W Statistic p-value
   1       0.1421075      1.713615    0.06
 Alternative hypothesis: rho != 0
```

Display the results.

```
summary(output)
```

```
            Df Sum Sq Mean Sq F value   Pr(>F)
feed         5 231129   46226   15.37 5.94e-10 ***
Residuals   65 195556    3009
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

If appropriate, perform a post hoc analysis.

```
TukeyHSD(output)
```

```
  Tukey multiple comparisons of means
    95% family-wise confidence level

Fit: aov(formula = weight ~ feed, data = chickwts)

$feed
                          diff         lwr       upr     p adj
horsebean-casein    -163.383333 -232.346876 -94.41979 0.0000000
linseed-casein      -104.833333 -170.587491 -39.07918 0.0002100
meatmeal-casein      -46.674242 -113.906207  20.55772 0.3324584
soybean-casein       -77.154762 -140.517054 -13.79247 0.0083653
sunflower-casein       5.333333  -60.420825  71.08749 0.9998902
linseed-horsebean     58.550000  -10.413543 127.51354 0.1413329
meatmeal-horsebean   116.709091   46.335105 187.08308 0.0001062
soybean-horsebean     86.228571   19.541684 152.91546 0.0042167
sunflower-horsebean  168.716667   99.753124 237.68021 0.0000000
meatmeal-linseed      58.159091   -9.072873 125.39106 0.1276965
soybean-linseed       27.678571  -35.683721  91.04086 0.7932853
sunflower-linseed    110.166667   44.412509 175.92082 0.0000884
```

```
soybean-meatmeal     -30.480519  -95.375109  34.41407 0.7391356
sunflower-meatmeal    52.007576  -15.224388 119.23954 0.2206962
sunflower-soybean     82.488095   19.125803 145.85039 0.0038845
```

Submitting

Submit the following to Canvas:

- Your rendered PDF titled Lastname_7R. Make sure your name is at the top of the document.
- Your .qmd file