Assignment 9: ANOVA

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# **Problem 1**:

## **Part A:**

### Hypothesis:

Null Hypothesis (H0): The mean bacteria count is the same for all four washing methods.

Alternative Hypothesis (Ha): The mean bacteria count is different for at least one pair of washing methods.

### Data Distribution Plot:

Chart, scatter chart

Description automatically generated

### ANOVA Analysis:

A picture containing chart

Description automatically generated

***F statistic:* 7.0636**

***p Value:* 0.0011**

***Conclusion:*** Since the p-value is less than 0.05, we can reject the null hypothesis, and say that there is at least one mean that is different from the rest.

## **Part B:**

### Analysis using Turkey’s HSD Method:

Table

Description automatically generated

***Conclusion:*** From the results obtained we can see that ab\_soap -spray, soap- spray and water- spray have p-value < 0.05. Hence, we reject the null hypothesis and they have significant differences. While, soap-ab\_soap, water-ab\_soap, and water-soap have p-value > 0.05. Thus, we do not reject the null hypothesis and they have very similar values.

# **Problem 2:**

## **Part A:**

### Hypothesis:

Null Hypothesis (H0): The mean hours count is the same for all three treatment methods.

Alternative Hypothesis (Ha): The mean hours count is different for different treatment methods.

### Data Distribution Plot:

Chart, box and whisker chart

Description automatically generated

### ANOVA Analysis:

Diagram

Description automatically generated with medium confidence

**F statistic: 10.0909**

***p Value:* 0.0008**

***Conclusion:*** Since the p-value is less than 0.05, we can reject the null hypothesis, and say that there is at least one mean that is different from the rest.

## **Part B:**

### Analysis using Turkey’s HSD Method:

Graphical user interface, table

Description automatically generated

***Conclusion:*** From the above table we can see that the B-A pair has a p-value >0.05. So, we do not reject the null hypothesis for this pair and thus they have similar mean treatment hours.

Whereas, pairs C-A and C-B have p-values < 0.05 and as a result we reject the null-hypothesis. Thus, they also have different mean treatment hours