

Lab 8 (65 pts. + 5 pts. BONUS): One-Way ANOVA

Objectives: Analyze data via the One-Way ANOVA method.

A. (65 pts.) The taxiing times between different airlines

We are particularly interested in comparing the time that it takes to taxi in between the following three airlines: UA (United Airlines), AA (American Airlines, and NW (Northwest Airlines). See the tutorial for Lab 7 on how to select only these airlines. Again, we will have to transform the variables. For R users: this transformed variable has to be in the same table as categorical variable. If you use attach, this needs to be stated AFTER you create your new variable. Please see the key for Lab 7 for details..

1. (10 pts.) Code
2. (10 pts.) Make side-by-side boxplots and an effects plot of the transformed data. Also, make a table giving the sample size, mean, and standard deviation for each treatment group. Besides the transformed mean and standard deviation, also include the original values. From this information, do you think that all of the means are the same? Be sure to comment on each of the plots.
3. (5 pts.) BONUS. Make an effect plot of the original data. Why do these graphs have different shapes? Why should you NOT use this graph in the analysis (that is, why is the question in part 2 concerning the transformed data and not the untransformed data)?
4. (10 pts.) Examine the assumptions necessary for ANOVA. Is it appropriate to continue the analysis? Be sure to state each of the assumptions and comment on each of them using the appropriate plots/data. Remember, you need to generate the normal probability plots and histograms for each population.
5. (15 pts.) Report the results of the ANOVA significance test (4 steps) using a significance level of 0.05. Are your results in this step consistent with what you stated in part 2?
6. (10 pts.) Use an appropriate multiple-comparison method to determine if any of the airline's average taxiing times into the terminal is worse. Explain why you chose this method. Present a graphical representation of the results if appropriate for your method. Write a short statement in complete English sentences for your conclusion.
7. (10 pts.) Write a short report explaining the difference between the taxiing times into the terminal of the airlines studied. It is important to state the original values though you need to state that the inference was performed on the transformed values. Be sure to discuss whether this data can be generalized to other Months with an explanation of your conclusion. This paragraph should be written in complete English sentences and should be understandable to someone who has not taken a course in Statistics.