

## DATA 3442- Lab 4 (Feb. 21, 2025)

The golf ball distance dataset provides a comprehensive examination of the distances achieved by different brands of golf balls. In the realm of golf, achieving optimal distance is crucial for performance, and golf ball manufacturers continuously strive to develop products that offer superior distance capabilities. This dataset serves as a valuable resource for analyzing and comparing the performance of various golf ball brands in terms of the distances they can achieve when struck.

The dataset consists of distance measurements obtained from a sample of golf balls belonging to four different brands, denoted as A, B, C, and D. Each observation in the dataset represents the distance achieved by a single golf ball of a specific brand, recorded in yards. The distances were likely measured under controlled conditions, such as on a driving range or golf course, using standardized equipment and techniques to ensure accuracy and consistency.

1. What is the significance of the F-test statistic obtained from the One-way ANOVA, and how does it inform about the differences in mean distances among golf brands?
2. Can you interpret the p-value associated with the F-test in the context of One-way ANOVA? What conclusions can be drawn based on its value?
3. What are the null and alternative hypotheses for the One-way ANOVA analysis, and how do they relate to the equality of mean distances among golf brands?
4. How does the Tukey's HSD test contribute to the analysis of golf brand performance, and what does it reveal about significant differences between specific pairs of brands? (Hint: By using code: `MEANS brand / tukey cldiff;`)
5. What insights can be gained from examining the Q-Q plots and descriptive statistics in terms of assessing the assumptions of One-way ANOVA?
6. How do the findings of the analysis influence practical decision-making processes, such as brand selection or quality control measures?
7. What are some potential limitations of the analysis, and how might they impact the validity of the results?
8. Are there any avenues for future research or additional analyses to further explore the relationship between golf brand performance and distance achieved?