1. Research Questions  
   To further analyze the Spring 2024 Airline Dataset, a series of questions have been formulated based on provided statements to understand the dynamics of flight pricing.
2. Does the mean of flight price differ significantly across airlines?

*ANOVA Testing: This question is suitable for ANOVA testing, where the flight prices are the dependent variable and the airlines act as the independent, categorical variable. The goal is to determine if there are statistically significant differences in average flight prices among different airlines, which factors like service quality, brand positioning, or route specializations could influence.*

Hypothesis Setup:

Null Hypothesis (H0): The average flight prices do not differ significantly across airlines.

Alternative Hypothesis (H1): At least one airline has a significantly different average flight price compared to others.

Reading the Result:

Look at the p-value in the ANOVA summary. If the p-value is less than your significance level (commonly 0.05), you reject the null hypothesis, indicating significant differences in flight prices among airlines.

1. Does flight duration impact flight prices, considering different airlines?  
   Does flight duration impact flight prices?  
   *Regression Testing: Utilize regression analysis to explore the relationship between flight duration (independent variable) and flight prices (dependent variable), with airline as a categorical factor. This analysis can help understand if longer flights tend to be more expensive and if this trend holds across various airlines.*

Hypothesis Setup:

Null Hypothesis (H0): Flight duration and the specific airline do not significantly predict flight prices.

Alternative Hypothesis (H1): Flight duration and/or airline significantly predict flight prices.

Reading the Result:

In the regression summary, examine the p-values for both the flight duration and airline variables (including their interaction term, if applicable). Significant p-values (typically <0.05) suggest that these factors are significant predictors of flight prices.

1. Is there a significant difference in flight prices based on the day of the week?  
   *ANOVA Testing: Apply ANOVA to investigate if flight prices on certain days of the week are significantly different when comparing international flights with domestic ones. This question seeks to explore how pricing strategies might vary based on flight type and weekly travel patterns.*

Hypothesis Setup:

Null Hypothesis (H0): There is no significant difference in flight prices based on the day of the week for international vs. domestic flights.

Alternative Hypothesis (H1): There is a significant difference in flight prices on certain days of the week.

Reading the Result:

Focus on the p-value for the interaction between flight type and day of the week. A significant p-value indicates that the day of the week affects flight prices differently for international versus domestic flights.

1. What factors best predict the price of a flight?  
   *Multiple Regression Testing: Conduct multiple regression analysis using flight price as the dependent variable and several independent variables such as flight duration, distance, time of day, and day of the week. This comprehensive approach can identify which factors have the most significant impact on pricing, offering insights into pricing strategies and customer preferences.*

Null Hypothesis (H0): The considered factors (flight duration, distance, time of day, day of the week) do not significantly predict flight prices.

Alternative Hypothesis (H1): The considered factors significantly predict flight prices.

Reading the Result:

Review the overall model significance (F-statistic and its p-value) and the p-values for individual predictors. Significant results indicate that these factors collectively (and possibly individually) predict flight prices.

1. Do holiday seasons lead to a significant increase in flight prices compared to non-holiday? Registration  
   *ANOVA Testing: This question aims to use ANOVA to assess the effect of holiday seasons on flight prices, with destination as a categorical variable. By comparing prices during holiday seasons against non-holiday periods for various destinations, we can understand the influence of demand surges on pricing.*

Hypothesis Setup:

Null Hypothesis (H0): Flight prices do not significantly vary during holiday seasons across different destinations.

Alternative Hypothesis (H1): Flight prices significantly vary during holiday seasons across different destinations.

Reading the Result:

Look at the p-value for the interaction effect between holiday seasons and destinations. A significant p-value suggests that holiday seasons impact flight prices, and this impact varies by destination.

For each test, after interpreting the p-values, you can look into other statistics like F-statistics for ANOVA or R-squared for regression to understand the model's explanatory power or effect size. Always ensure your interpretation aligns with your research objectives and hypotheses, providing a clear narrative on how the statistical findings support or refute your initial hypotheses.