**Hypothesis Testing-Cutlets Dataset**

**1. Problem Statement**:

A Food and Beverage (F&B) manager wants to determine whether there is a significant difference in the diameter of the cutlet between two units. They have collected a randomly selected sample of cutlets from both units and measured their diameters.

**2. Assumptions**:

- The samples from both units are random and representative of their respective populations.

- The diameter of the cutlet follows a normal distribution within each unit. We can check this assumption by visual inspection (using histograms or Q-Q plots) or by performing a normality test like the Shapiro-Wilk test.

- The variances of the diameters in both units are equal (homogeneity of variances). This can be checked using tests like Levene's test or Bartlett's test.

**3. Tests:**

- \*\*Test for Normality\*\*: To ensure that the diameters of the cutlets follow a normal distribution, we can perform Shapiro-Wilk tests separately for each unit's sample. If the p-values are greater than the significance level (e.g., 0.05), we can assume normality.

- \*\*Test for Homogeneity of Variances\*\*: We need to ensure that the variances of the diameters in both units are equal. This can be done using Levene's test or Bartlett's test. If the p-value is greater than 0.05, we can assume equal variances.

**4. Statistical Analysis**:

Once we have verified the assumptions, we can proceed with the statistical test to determine if there is a significant difference in the mean diameter between the two units. Since we're comparing the means of two independent samples, the appropriate test is the independent samples t-test (also known as the two-sample t-test). This test will tell us if the difference in means is statistically significant.

**5. Inferences**:

After conducting the t-test, we will obtain a p-value. If this p-value is less than the chosen significance level (typically 0.05), we reject the null hypothesis. In this context, rejecting the null hypothesis would indicate that there is a significant difference in the mean diameter of cutlets between the two units. If the p-value is greater than 0.05, we fail to reject the null hypothesis, suggesting that there is no significant difference in the mean diameter between the two units.

**6. Reporting**:

Finally, it's important to report the findings including the results of normality and homogeneity of variance tests, the t-test statistic, degrees of freedom, and the p-value. Additionally, providing confidence intervals for the difference in means can offer more insights into the magnitude of the difference.