***Assignment: Chi-Square Test***

***Objective:*** To determine if there's a significant association between the type of smart home device purchased (Smart Thermostats vs. Smart Lights) and the customer satisfaction level.

1. **Determine Hypothesis Statement**

Null Hypothesis, H0: There is no association between the type of smart home device purchased (Smart Thermostats vs. Smart Lights) and the customer satisfaction level.

Alternative Hypothesis H1: There is a significant association between the type of smart home device purchased (Smart Thermostats vs. Smart Lights) and the customer satisfaction level.

1. **Compute the Chi-square Statistic**

The Chi-square statistic is 5.638 (calculated using Python).

1. **Determine the Critical Value**

The Critical Value is 9.488 (calculated using Python).

1. **Make a Decision**

If the calculated Chi-square value is greater than the critical value, we can reject H0. Otherwise, we fail to reject H0.

***Conclusion:*** Since the Chi-square value is less than the critical value, we fail to reject the null hypothesis. Hence, there is no significant association between the type of smart home device purchased (Smart Thermostats vs. Smart Lights) and the customer satisfaction level.

***Assignment: Hypothesis Testing***

***Objective:*** To investigate the restaurant owners' claim about the increase in weekly operating costs using hypothesis testing.

1. **Determine Hypothesis Statement**

Null Hypothesis, H0: The mean weekly operating cost is equal to the theoretical weekly operating cost (H0: *μ = μ*0)

Alternative Hypothesis H1: The mean weekly operating cost is higher than the theoretical weekly operating cost (H1: *μ > μ*0)

1. **Calculate the Test Statistic**

Since sample size, n < 30 we use a t-test because the sample size is too small to assume the sampling distribution is normal.

The t-score is -38.0 (calculated using Python).

1. **Determine the Critical Value:**

The Critical Value is 1.711(calculated using Python).

1. **Make a Decision**

If the calculated t-value is greater than the critical value from the Z-table, we can reject H0. Otherwise, we fail to reject H0.

***Conclusion:*** Since the calculated t-value is not greater than the critical value, we fail to reject H0. Hence, we can conclude that there is not enough evidence to support the restaurant owners' claim that the weekly operating costs are higher than the model suggests.