Chi-Square test

**Association between Device Type and Customer Satisfaction**

**Background:**

Mizzare Corporation has collected data on customer satisfaction levels for two types of smart home devices: Smart Thermostats and Smart Lights. They want to determine if there's a significant association between the type of device purchased and the customer's satisfaction level.

**Data Provided:**

The data is summarized in a contingency table showing the counts of customers in each satisfaction level for both types of devices:

| **Satisfaction** | **Smart Thermostat** | **Smart Light** | **Total** |
| --- | --- | --- | --- |
| Very Satisfied | 50 | 70 | 120 |
| Satisfied | 80 | 100 | 180 |
| Neutral | 60 | 90 | 150 |
| Unsatisfied | 30 | 50 | 80 |
| Very Unsatisfied | 20 | 50 | 70 |
| **Total** | 240 | 360 | 600 |

**Objective:**

To use the Chi-Square test for independence 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.

**Assignment Tasks:**

1. **State the Hypotheses:**
   * **Null Hypothesis (H₀):** There is **no association** between device type and customer satisfaction.
   * **Alternative Hypothesis (H₁):** There **is an association** between device type and customer satisfaction.
2. **Compute the Chi-Square Statistic:**
   * **Chi-Square Statistic: 5.63**
3. **Determine the Critical Value:**
   * Using the significance level (alpha) of 0.05 and the degrees of freedom (which is the number of categories minus 1)
   * Critical Value: 9.4
4. **Make a Decision:**
   * Compare the Chi-Square statistic with the critical value to decide whether to reject the null hypothesis.
   * 5.63>9.4 = Fail to reject null hypothesis

**Submission Guidelines:**

* Provide a detailed report of your analysis, including each step outlined in the assignment tasks in a python file.
* Include all calculations, the Chi-Square statistic, the critical value, and your conclusion.