**Problem Statement**

A researcher wants to investigate whether there is a significant difference in the mean test scores of students who study with different techniques. The two groups of students use either flashcards (Group A) or take practice tests (Group B). The test scores for each group are given below:

**Dataset**

| **Student** | **Group** | **Test Score** |
| --- | --- | --- |
| 1 | A | 85 |
| 2 | A | 87 |
| 3 | A | 90 |
| 4 | A | 88 |
| 5 | A | 92 |
| 6 | A | 84 |
| 7 | B | 78 |
| 8 | B | 75 |
| 9 | B | 80 |
| 10 | B | 82 |
| 11 | B | 79 |
| 12 | B | 77 |

**Task**

Perform an Independent Samples T-Test to determine if there is a significant difference in the mean test scores between students who use flashcards and those who take practice tests.

**Steps**

1. **Formulate Hypotheses**:
   * **Null Hypothesis (H0H\_0H0​)**: The mean test scores are equal for both groups (μA=μB\mu\_A = \mu\_BμA​=μB​).
   * **Alternative Hypothesis (H1H\_1H1​)**: The mean test scores are different for the two groups (μA≠μB\mu\_A \neq \mu\_BμA​=μB​).

**Problem Statement**

A market researcher wants to determine if there is an association between the type of advertisement (Online, TV, or Print) and the level of consumer response (High, Medium, or Low). The researcher collects data from a sample of consumers and records their response to different types of advertisements. The data is summarized in the table below:

**Dataset**

| **Advertisement Type** | **High** | **Medium** | **Low** |
| --- | --- | --- | --- |
| Online | 30 | 50 | 20 |
| TV | 40 | 30 | 30 |
| Print | 20 | 40 | 40 |

**Task**

Perform a Chi-Square Test of Independence to determine if there is a significant association between the type of advertisement and the level of consumer response.

**Steps**

1. **Formulate Hypotheses**:
   * **Null Hypothesis (H0H\_0H0​)**: There is no association between the type of advertisement and the level of consumer response.
   * **Alternative Hypothesis (H1H\_1H1​)**: There is an association between the type of advertisement and the level of consumer response.

**Practice Problem: One-Way ANOVA**

**Problem Statement**

A researcher wants to examine whether different diets have an impact on weight loss. The researcher recruits 15 participants and assigns each participant to one of three different diets: Diet A, Diet B, and Diet C. After four weeks, the weight loss in kilograms for each participant is recorded. The dataset is provided below.

**Dataset**

| **Participant** | **Diet** | **Weight Loss (kg)** |
| --- | --- | --- |
| 1 | A | 5.0 |
| 2 | A | 4.5 |
| 3 | A | 6.0 |
| 4 | A | 5.5 |
| 5 | A | 5.2 |
| 6 | B | 7.0 |
| 7 | B | 6.5 |
| 8 | B | 6.8 |
| 9 | B | 7.2 |
| 10 | B | 7.1 |
| 11 | C | 4.0 |
| 12 | C | 4.2 |
| 13 | C | 4.5 |
| 14 | C | 3.8 |
| 15 | C | 4.3 |

**Task**

Perform a One-Way ANOVA to determine if there is a significant difference in the mean weight loss among the three diets.

**Steps**

1. **Formulate Hypotheses**:
   * **Null Hypothesis (H0H\_0H0​)**: The mean weight loss is the same for all three diets.
   * **Alternative Hypothesis (H1H\_1H1​)**: At least one diet has a different mean weight loss.