**Problem Statement 1:**

A company wants to evaluate the effectiveness of three different types of marketing strategies (Email Marketing, Social Media Advertising, and Print Advertising) on sales performance. Over the course of one month, they implemented each marketing strategy in three different regions and recorded the sales figures for each region.

The objective is to determine if there is a significant difference in average sales performance among the three marketing strategies.

### Sample Data Table:

| **Region** | **Marketing Strategy** | **Sales (in $)** |
| --- | --- | --- |
| 1 | Email Marketing | 1200 |
| 2 | Email Marketing | 1500 |
| 3 | Email Marketing | 1350 |
| 4 | Social Media Advertising | 1800 |
| 5 | Social Media Advertising | 2100 |
| 6 | Social Media Advertising | 1950 |
| 7 | Print Advertising | 1100 |
| 8 | Print Advertising | 900 |
| 9 | Print Advertising | 950 |

**Problem Statement 2:**

A company wants to analyze how the experience level and educational background of employees affect their annual salary. They have collected data on employees' years of experience, highest degree obtained (Bachelor's, Master's, or Ph.D.), and their annual salary. The goal is to determine whether there is a significant difference in salaries based on:

1. **Years of experience**.
2. **Highest degree obtained**.
3. **The interaction between experience and degree**.

You are tasked with performing an ANOVA to analyze whether these factors significantly influence the annual salary.

**Sample Data Table:**

| **Employee ID** | **Years of Experience** | **Highest Degree** | **Annual Salary (in $)** |
| --- | --- | --- | --- |
| 1 | 5 | Bachelor's | 60,000 |
| 2 | 10 | Master's | 80,000 |
| 3 | 15 | Ph.D. | 120,000 |
| 4 | 3 | Bachelor's | 55,000 |
| 5 | 8 | Master's | 75,000 |
| 6 | 12 | Ph.D. | 110,000 |
| 7 | 7 | Bachelor's | 65,000 |
| 8 | 14 | Master's | 95,000 |
| 9 | 9 | Ph.D. | 100,000 |
| 10 | 6 | Bachelor's | 62,000 |

**Problem Statement 3:**

A fitness center wants to evaluate the effect of different training programs and diet plans on the weight loss of their clients over a 6-month period. They have collected data on clients who followed different combinations of training programs (Cardio, Strength, or Mixed) and diet plans (Low Carb, High Protein, or Balanced). The goal is to determine whether there is a significant difference in weight loss based on:

1. **Training program**.
2. **Diet plan**.
3. **The interaction between training program and diet plan**.

You are tasked with performing an ANOVA to analyze whether these factors significantly influence weight loss.

**Sample Data Table:**

| **Client ID** | **Training Program** | **Diet Plan** | **Weight Loss (in kg)** |
| --- | --- | --- | --- |
| 1 | Cardio | Low Carb | 7.2 |
| 2 | Strength | High Protein | 6.0 |
| 3 | Mixed | Balanced | 8.5 |
| 4 | Cardio | High Protein | 7.0 |
| 5 | Strength | Low Carb | 5.8 |
| 6 | Mixed | High Protein | 9.0 |
| 7 | Cardio | Balanced | 7.3 |
| 8 | Strength | Balanced | 6.2 |
| 9 | Mixed | Low Carb | 8.7 |
| 10 | Cardio | Low Carb | 7.5 |

**Problem Statement 4:**

A food company is conducting an experiment to analyze the effect of different types of packaging (Plastic, Glass, and Metal) and storage conditions (Room Temperature and Refrigerated) on the shelf life of a new product. The company wants to determine if there are any significant differences in shelf life based on the packaging type and storage conditions.

The experiment is designed to test the shelf life of the product under each combination of packaging type and storage condition.

### Sample Data Table:

| **Packaging Type** | **Storage Condition** | **Shelf Life (in days)** |
| --- | --- | --- |
| Plastic | Room Temperature | 30 |
| Plastic | Refrigerated | 60 |
| Glass | Room Temperature | 45 |
| Glass | Refrigerated | 75 |
| Metal | Room Temperature | 40 |
| Metal | Refrigerated | 70 |

Perform a Two-Way ANOVA to analyze the effects of packaging type and storage condition on shelf life.

**Problem Statement 5:**

A tech company is testing the effectiveness of three different training methods (Online, In-Person, and Hybrid) on employee productivity. Additionally, they want to see if the productivity differs based on the employees' experience levels (Junior, Mid-Level, and Senior).

The company conducts a study to evaluate employee productivity scores after completing the training program under different training methods and experience levels.

### Sample Data Table:

| **Training Method** | **Experience Level** | **Productivity Score** |
| --- | --- | --- |
| Online | Junior | 75 |
| Online | Mid-Level | 80 |
| Online | Senior | 85 |
| In-Person | Junior | 70 |
| In-Person | Mid-Level | 78 |
| In-Person | Senior | 90 |
| Hybrid | Junior | 72 |
| Hybrid | Mid-Level | 82 |
| Hybrid | Senior | 88 |

Perform a Two-Way ANOVA to analyze the effects of training method and experience level on employee productivity scores.