Assignments-On Stats

1.A researcher wants to compare the exam scores of students from three different teaching methods.
Method_A = [85, 88, 90, 86, 87]
Method_B = [78, 80, 74, 76, 79]
Method_C = [92, 94, 89, 91, 93]
Task:

- Perform **One-Way ANOVA** to test if there's a significant difference in means among the three methods.
- Significance level $\alpha = 0.05$

2. A company evaluates the productivity of employees based on two training programs and gender.

Data:

Training	Gender	Productivity
T1	M	80, 82, 85
T1	F	78, 76, 79
T2	M	88, 90, 87
T2	F	85, 84, 86

Task:

- Perform **Two-Way ANOVA** to check:
  - Effect of training
  - Effect of gender
  - Interaction effect between gender and training

3. Chi-Square Test of Independence

Scenario:

A supermarket wants to check if there's an association between **gender** and **preferred snack**.

Data:

	Chips	Cookies	Fruits
Male	30	20	10
Female	25	30	15

Task:

- Use **Chi-Square test of independence** to check if snack preference is associated with gender.
- $\alpha = 0.05$

4. One Sample T-Test

Scenario:

You want to check if a new diet plan results in a weight loss from the **average expected weight of 70kg**.

weights = [68, 69, 67, 66, 70, 71, 69]

Task:

- Use **one-sample T-test** to test if the average weight is significantly different from 70kg.

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5. Independent Two-Sample T-Test

Scenario:

Compare average test scores of **two different classes**.

Class_A = [85, 87, 90, 83, 88]
Class_B = [78, 82, 80, 79, 81]

Task:

- Perform a **paired t-test** to test if the coaching program had a significant effect.

6. Z-Test for Proportions

Scenario:

You want to know if the **proportion of left-handed students** in a school differs from the general population (10%).

Data:

- Sample size = 200 students
- Left-handed students = 30

Task:

- Perform a **z-test for proportion** to test if the school has a significantly different rate of left-handed students.