Scenario 1:

Flight Delay Analysis

An airline tracks flight delays (in minutes) for 20 flights. Analyze the flight delays to calculate percentiles, detect outliers, and evaluate the overall distribution.

calculate percentiles: Calculate in different percentile to analyze flight delay
detect outliers:
Lower_bound= Q1 – 1.5*IQR
Upper_bound= Q3 + 1.5*IQR
If data is lower than Lower_bound value then it is Lower Outlier
If data is greater than Greater_bound value then it is Upper Outlier
overall distribution: Histogram, boxplot

Scenario 2:

Employee Salary Analysis

A company wants to analyze the salary distribution of its employees to understand the central tendency and determine whether the data is skewed.

central tendency: Mean = Total sum of scores/Total no.of elements in scores

Median = Check total no. of elements is odd or even. Odd= n+1/2, Even = center 2 values/2

Mode = Repeated values

Skew: If (Mean > Median > Mode) = Negative Skew

If (Mode > Median > Mean) = Positive Skew, If (Mode = Median = Mean) = Symmetrical

Scenario 3:

Product Sales Analysis

A retail store records product sales over 15 days. Create a frequency distribution table and visualize the sales data using appropriate charts.

Frequency:
It shows the number of times (frequency) each value or range of values occurs in a data set.

appropriate charts: Using histogram, Barplot visualize the graph

Scenario 4:

Student Exam Performance Analysis

A school wants to analyze the exam performance of students across three subjects: Mathematics, Science, and English. How can Data Science concepts be applied to understand their performance?

Data Preprocessing: Update the null values and outliers
Descriptive: Calculate the Mean, Median, Mode, Standard Deviation
Visualization: Histogram, heatmap for correlation

Scenario 5:

Clinical Trial for Diabetes Medication

A pharmaceutical company conducted a clinical trial with two groups: one receiving medication and the other a placebo. Perform a hypothesis test to determine the effectiveness of the medication.

We can do a t-test Unpaired test using Hypothesis Testing we can confirm the effectiveness.

Hypothesis Test: if (p_value <=0.05) then it reject null hypothesis(Medicine works) else accept the null hypothesis(Medicine doesn't work).