**Project: Food Waste Exploratory Data Analysis**

**Problem Statement:**

You are given a food service dataset with attributes like meals served, kitchen staff count, weather

conditions (temperature, humidity), staff experience levels, special events, and food waste

categories (dairy, meat, vegetables, barley, wheat, grains). The goal is to analyze food waste

patterns and identify factors contributing to waste to provide actionable recommendations for

reducing food waste in meal service operations.

Requirements:

Data Preprocessing:

Remove duplicate records from the dataset

Handle missing values in meals\_served, kitchen\_staff, humidity\_percent, past\_waste\_kg,

staff\_experience, and waste\_category columns

Correct inconsistencies in categorical variables (staff\_experience, waste\_category)

Identify and cap outliers in numerical variables

Convert date column to datetime format and sort data chronologically

Time Series Analysis:

Plot meal service trends over time (line plot)

Identify and analyze spikes in meal service (meals > 3000)

Create seasonal categorization (Spring, Summer, Autumn, Winter)

Analyze waste patterns by day of the week and months

Categorical Analysis:

Compare average food waste by staff experience levels (bar plot)

Analyze waste distribution across different food categories (pie charts/bar plots)

Create seasonal waste analysis by food category (heatmap)

Examine the relationship between special events and meal volume

Correlation Analysis:

Plot correlation heatmap between numerical variables (meals\_served, kitchen\_staff,

temperature, humidity, past\_waste\_kg)

Analyze relationship between weather conditions and food waste

Study correlation between staff count and waste levels

Visualization Requirements:

Time series line plots showing meal trends and waste patterns over time

Seasonal heatmaps displaying waste by food category across seasons

Bar plots comparing waste levels across staff experience categories

Box plots showing waste distribution by food categories

Scatter plots analyzing relationships between meals served and waste generated

Interactive visualizations for exploring waste patterns by multiple dimensions

Key Insights to Discover:

Seasonal patterns in food waste across different categories

Impact of staff experience on waste reduction

Identification of high-waste periods and their causes

Weather influence on food waste patterns

Optimal inventory recommendations based on seasonal trends

Deliverables:

Comprehensive data cleaning and preprocessing pipeline

Statistical analysis of waste patterns across multiple dimensions

Visual dashboard showing key waste metrics and trends

Actionable recommendations for waste reduction strategies

Documentation of methodology and findings