Task: Biomechanics and Diet Analysis for Athletes

Objective
Develop a Python-based program to analyze and visualize both biomechanics and diet data of athletes. The program will process the biomechanics data of athletes alongside their diet details and offer insights into the relationship between diet and athletic performance, focusing on visualizing performance trends and basic data manipulation.

Tasks

1. **Data Import and Cleaning**

   o   Load the biomechanics and diet data from a single CSV file.

   o   Clean the data to handle missing values or outliers (e.g., remove invalid data points or replace them with appropriate values).

2. **Data Manipulation**

   o   Calculate key performance metrics such as average speed, acceleration, and force exerted by athletes during their movements.

   o   Compute the average calorie intake, macronutrients (carbs, proteins, fats), and the athlete's nutritional balance.

   o   Analyze how calorie intake and macronutrient distribution correlate with athletic performance metrics.

3. **Performance vs. Diet Analysis**

   o   Investigate the relationship between an athlete's diet and their biomechanical performance (e.g., does higher protein intake correlate with higher force exerted?).

   o   Categorize athletes based on diet types (e.g., "Balanced," "High-protein," "High-carb") and their corresponding performance.

4. **Visualization**

   o   Create visualizations such as:

      ▪   Line charts showing speed, acceleration, or force exerted over time.

      ▪   Bar charts comparing athletes' average daily calorie intake, carbs, protein, and fat across different athletes.

      ▪   Scatter plot showing the relationship between calorie intake and performance (e.g., speed or force).

      ▪   Heatmap to visualize correlations between macronutrient intake and performance metrics.