**5.**Scenario: You are a data analyst working for a car manufacturing company. As part of your analysis, you have a dataset containing information about the fuel efficiency of different car models. The dataset is stored in a NumPy array named fuel\_efficiency, where each element represents the fuel efficiency (in miles per gallon) of a specific car model. Your task is to calculate the average fuel efficiency and determine the percentage improvement in fuel efficiency between two car models.

Question: How would you use NumPy arrays and arithmetic operations to calculate the average fuel efficiency and determine the percentage improvement in fuel efficiency between two car models?

**Code:**

import pandas as pd

import numpy as np

df = pd.read\_csv(r"C:\Users\jampa\OneDrive\文档\fuel\_efficiency\_data.csv")

fuel\_efficiency = df['FuelEfficiency'].to\_numpy()

average\_efficiency = np.mean(fuel\_efficiency)

efficiency\_model\_2 = df.loc[df['CarModel'] == 'Model\_2', 'FuelEfficiency'].values[0]

efficiency\_model\_7 = df.loc[df['CarModel'] == 'Model\_7', 'FuelEfficiency'].values[0]

percentage\_improvement = ((efficiency\_model\_7 - efficiency\_model\_2) / efficiency\_model\_2) \* 100

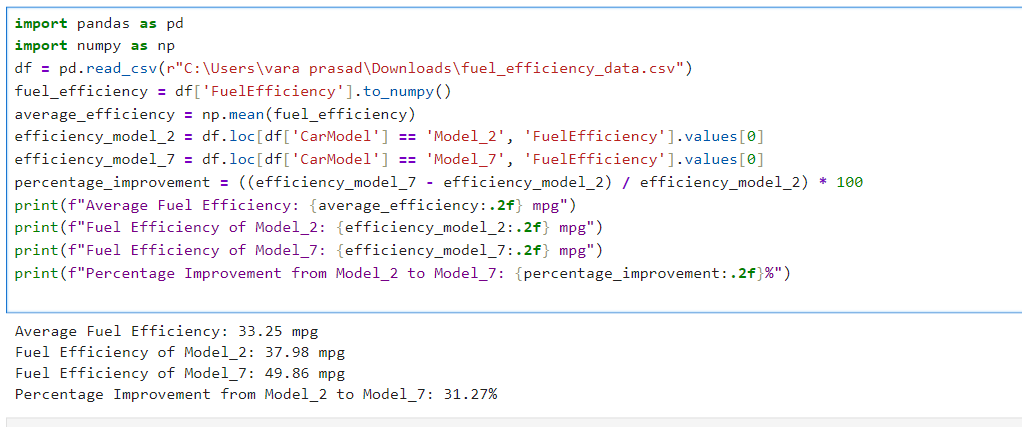
print(f"Average Fuel Efficiency: {average\_efficiency:.2f} mpg")

print(f"Fuel Efficiency of Model\_2: {efficiency\_model\_2:.2f} mpg")

print(f"Fuel Efficiency of Model\_7: {efficiency\_model\_7:.2f} mpg")

print(f"Percentage Improvement from Model\_2 to Model\_7: {percentage\_improvement:.2f}%")

**Output:**



Dataset:

|  |  |  |
| --- | --- | --- |
| CarModel | FuelEfficiency | |
| Model\_1 | 48.40069 |
| Model\_2 | 37.98048 |
| Model\_3 | 49.99469 |
| Model\_4 | 18.80269 |
| Model\_5 | 24.44225 |
| Model\_6 | 39.59364 |
| Model\_7 | 49.85823 |
| Model\_8 | 22.65388 |
| Model\_9 | 15.46178 |
| Model\_10 | 25.3592 |