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\hp\Desktop\car\_models\_fuel\_efficiency.csv')

fuel\_efficiency = df['Fuel\_Efficiency\_MPG'].to\_numpy()

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

print(f"Average fuel efficiency across all models: {average\_efficiency:.2f} MPG")

model\_a\_index = 9

model\_b\_index = 49

model\_a\_efficiency = fuel\_efficiency[model\_a\_index]

model\_b\_efficiency = fuel\_efficiency[model\_b\_index]

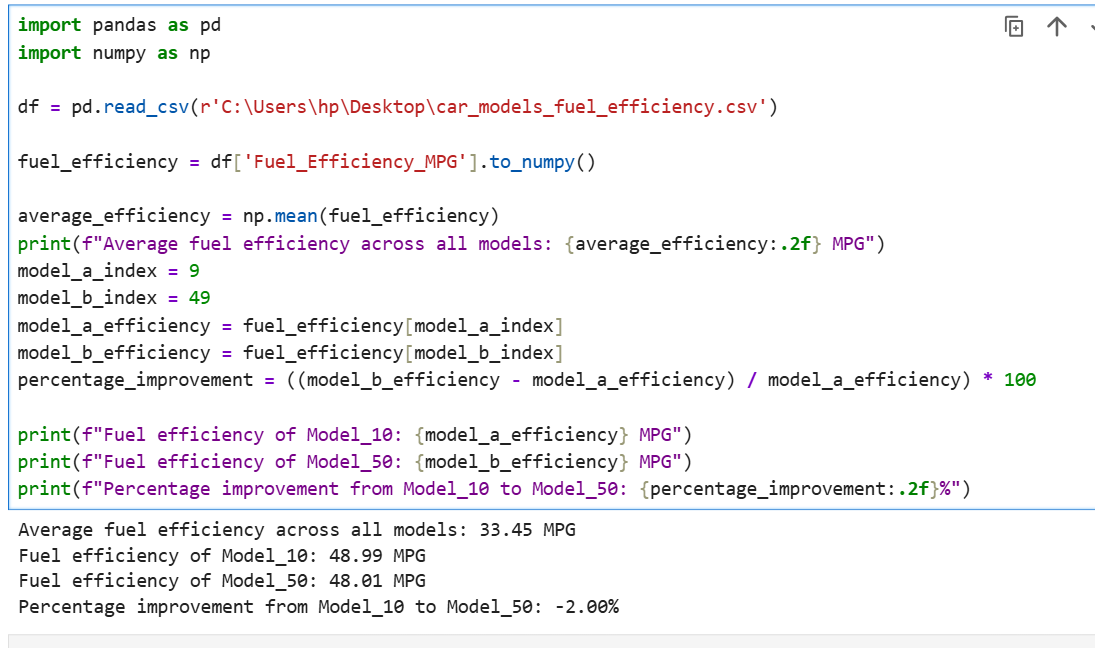
percentage\_improvement = ((model\_b\_efficiency - model\_a\_efficiency) / model\_a\_efficiency) \* 100

print(f"Fuel efficiency of Model\_10: {model\_a\_efficiency} MPG")

print(f"Fuel efficiency of Model\_50: {model\_b\_efficiency} MPG")

print(f"Percentage improvement from Model\_10 to Model\_50: {percentage\_improvement:.2f}%")

OUTPUT:



DATASET:

|  |  |  |  |
| --- | --- | --- | --- |
| Car\_Model | Fuel\_Efficiency\_MPG | | |
| Model\_1 | 24.56 |  |  |
| Model\_2 | 33.29 |  |  |
| Model\_3 | 45.78 |  |  |
| Model\_4 | 19.45 |  |  |
| Model\_5 | 41.83 |  |  |
| Model\_6 | 39.67 |  |  |
| Model\_7 | 29.38 |  |  |
| Model\_8 | 36.22 |  |  |
| Model\_9 | 23.58 |  |  |
| Model\_10 | 48.99 |  |  |
| Model\_11 | 17.82 |  |  |
| Model\_12 | 44.67 |  |  |
| Model\_13 | 31.75 |  |  |
| Model\_14 | 21.48 |  |  |
| Model\_15 | 26.95 |  |  |
| Model\_16 | 42.63 |  |  |
| Model\_17 | 37.28 |  |  |
| Model\_18 | 47.05 |  |  |
| Model\_19 | 16.43 |  |  |
| Model\_20 | 28.41 |  |  |
| Model\_21 | 30.87 |  |  |
| Model\_22 | 25.44 |  |  |
| Model\_23 | 22.01 |  |  |
| Model\_24 | 32.54 |  |  |
| Model\_25 | 27.18 |  |  |
| Model\_26 | 43.12 |  |  |
| Model\_27 | 20.74 |  |  |
| Model\_28 | 49.33 |  |  |
| Model\_29 | 46.85 |  |  |
| Model\_30 | 34.98 |  |  |
| Model\_31 | 19.62 |  |  |
| Model\_32 | 38.2 |  |  |
| Model\_33 | 40.72 |  |  |
| Model\_34 | 45.13 |  |  |
| Model\_35 | 29.84 |  |  |
| Model\_36 | 33.5 |  |  |
| Model\_37 | 18.29 |  |  |
| Model\_38 | 25.96 |  |  |
| Model\_39 | 31.11 |  |  |
| Model\_40 | 47.68 |  |  |
| Model\_41 | 36.77 |  |  |
| Model\_42 | 44.33 |  |  |
| Model\_43 | 22.96 |  |  |
| Model\_44 | 27.62 |  |  |
| Model\_45 | 23.73 |  |  |
| Model\_46 | 35.44 |  |  |
| Model\_47 | 30.35 |  |  |
| Model\_48 | 26.84 |  |  |
| Model\_49 | 21.09 |  |  |
| Model\_50 | 48.01 |  |  |
| Model\_51 | 32.76 |  |  |
| Model\_52 | 37.19 |  |  |
| Model\_53 | 43.88 |  |  |
| Model\_54 | 19.07 |  |  |
| Model\_55 | 27.81 |  |  |
| Model\_56 | 40.94 |  |  |
| Model\_57 | 38.48 |  |  |
| Model\_58 | 31.55 |  |  |
| Model\_59 | 24.18 |  |  |
| Model\_60 | 49.72 |  |  |
| Model\_61 | 17.61 |  |  |
| Model\_62 | 45.5 |  |  |
| Model\_63 | 34.15 |  |  |
| Model\_64 | 28.33 |  |  |
| Model\_65 | 36.94 |  |  |
| Model\_66 | 42.07 |  |  |
| Model\_67 | 47.94 |  |  |
| Model\_68 | 29.11 |  |  |
| Model\_69 | 21.67 |  |  |
| Model\_70 | 39.2 |  |  |
| Model\_71 | 33.76 |  |  |
| Model\_72 | 41.59 |  |  |
| Model\_73 | 26.33 |  |  |
| Model\_74 | 22.79 |  |  |
| Model\_75 | 44.88 |  |  |
| Model\_76 | 37.86 |  |  |
| Model\_77 | 19.88 |  |  |
| Model\_78 | 30.04 |  |  |
| Model\_79 | 24.61 |  |  |
| Model\_80 | 48.55 |  |  |
| Model\_81 | 32.12 |  |  |
| Model\_82 | 46.21 |  |  |
| Model\_83 | 35.66 |  |  |
| Model\_84 | 20.29 |  |  |
| Model\_85 | 27.05 |  |  |
| Model\_86 | 38.82 |  |  |
| Model\_87 | 43.41 |  |  |
| Model\_88 | 31.3 |  |  |
| Model\_89 | 23.2 |  |  |
| Model\_90 | 49.05 |  |  |
| Model\_91 | 18.43 |  |  |
| Model\_92 | 45 |  |  |
| Model\_93 | 34.62 |  |  |
| Model\_94 | 28.05 |  |  |
| Model\_95 | 36.49 |  |  |
| Model\_96 | 41.28 |  |  |
| Model\_97 | 47.4 |  |  |
| Model\_98 | 29.54 |  |  |
| Model\_99 | 20.87 |  |  |
| Model\_100 | 39.88 |  |  |
|  |  |  |  |