import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

from sklearn.model\_selection import train\_test\_split

from sklearn.linear\_model import LinearRegression

from sklearn.metrics import mean\_absolute\_error, mean\_squared\_error, r2\_score

df = pd.read\_csv('house\_prices.csv')

df = df.dropna()

# Simple Linear Regression

X\_simple = df[['area']]

y = df['price']

X\_train\_s, X\_test\_s, y\_train\_s, y\_test\_s = train\_test\_split(X\_simple, y, test\_size=0.2, random\_state=42)

model\_simple = LinearRegression()

model\_simple.fit(X\_train\_s, y\_train\_s)

y\_pred\_s = model\_simple.predict(X\_test\_s)

mae\_s = mean\_absolute\_error(y\_test\_s, y\_pred\_s)

mse\_s = mean\_squared\_error(y\_test\_s, y\_pred\_s)

r2\_s = r2\_score(y\_test\_s, y\_pred\_s)

print("Simple Linear Regression Results")

print(f"MAE: {mae\_s}")

print(f"MSE: {mse\_s}")

print(f"R²: {r2\_s}")

print(f"Coefficient: {model\_simple.coef\_[0]}")

print(f"Intercept: {model\_simple.intercept\_}")

plt.scatter(X\_test\_s, y\_test\_s, color='blue', label='Actual')

plt.plot(X\_test\_s, y\_pred\_s, color='red', linewidth=2, label='Predicted Line')

plt.xlabel('Area')

plt.ylabel('Price')

plt.title('Simple Linear Regression - Area vs Price')

plt.legend()

plt.show()

# Multiple Linear Regression

X\_multiple = df[['area', 'bedrooms', 'bathrooms']]

y = df['price']

X\_train\_m, X\_test\_m, y\_train\_m, y\_test\_m = train\_test\_split(X\_multiple, y, test\_size=0.2, random\_state=42)

model\_multiple = LinearRegression()

model\_multiple.fit(X\_train\_m, y\_train\_m)

y\_pred\_m = model\_multiple.predict(X\_test\_m)

mae\_m = mean\_absolute\_error(y\_test\_m, y\_pred\_m)

mse\_m = mean\_squared\_error(y\_test\_m, y\_pred\_m)

r2\_m = r2\_score(y\_test\_m, y\_pred\_m)

print("\nMultiple Linear Regression Results")

print(f"MAE: {mae\_m}")

print(f"MSE: {mse\_m}")

print(f"R²: {r2\_m}")

print(f"Coefficients: {model\_multiple.coef\_}")

print(f"Intercept: {model\_multiple.intercept\_}")