import numpy as np

import matplotlib.pyplot as plt

from sklearn.datasets import load\_iris

from sklearn.neighbors import KNeighborsClassifier

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

# Load Iris dataset and use only 2 features

iris = load\_iris()

X = iris.data[:, :2] # Sepal length & width

y = iris.target

# Split data

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

# Fit KNN

knn = KNeighborsClassifier(n\_neighbors=5)

knn.fit(X\_train, y\_train)

# Create mesh grid

x\_min, x\_max = X[:, 0].min() - 1, X[:, 0].max() + 1

y\_min, y\_max = X[:, 1].min() - 1, X[:, 1].max() + 1

xx, yy = np.meshgrid(np.arange(x\_min, x\_max,0.02),np.arange(y\_min, y\_max, 0.02))

# Predict over grid

Z = knn.predict(np.c\_[xx.ravel(), yy.ravel()])

Z = Z.reshape(xx.shape)

# Plot

plt.figure(figsize=(8, 6))

plt.contourf(xx, yy, Z, cmap=plt.cm.Pastel2,alpha=0.8)

plt.scatter(X\_train[:, 0], X\_train[:, 1], c=y\_train,edgecolors='k', label='Train', cmap=plt.cm.Set1)

plt.scatter(X\_test[:, 0], X\_test[:, 1], c=y\_test,marker='x', label='Test', cmap=plt.cm.Set1)

plt.xlabel("Sepal length")

plt.ylabel("Sepal width")

plt.title("KNN Decision Boundary (k=5)")

plt.legend()

plt.grid(True)

plt.show()