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import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

# Data
df = pd.DataFrame({'x': [13,27,35,49,58,62,74,81,93,15,38,47,55,67,78,84,92,10,31,59],
                    'y': [88,76,65,54,47,39,30,22,15,91,73,59,44,37,28,20,12,95,80,50]})

# Initial centroids
centroid = {1:[20,20], 2:[60,60], 3:[30,80]}

# Assign points to nearest centroid
for i in centroid:
    df[i] = ((df.x - centroid[i][0])**2 + (df.y - centroid[i][1])**2)**0.5
df['cluster'] = df[[1,2,3]].idxmin(axis=1)

# Update centroids once
for i in centroid:
    pts = df[df.cluster == i]
    centroid[i] = [pts.x.mean(), pts.y.mean()]

# Plot
color = {1:'r', 2:'g', 3:'b'}
df['col'] = df.cluster.map(color)
plt.scatter(df.x, df.y, c=df.col)
plt.show()

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