**SOM CODE :**

import pandas as pd

import numpy as np

from minisom import MiniSom

import matplotlib.pyplot as plt

from sklearn.preprocessing import MinMaxScaler

# Load the dataset

file\_path = "C:/Users/HP/Desktop/emc java/Hotel.csv"

hotel\_data = pd.read\_csv(file\_path)

# Select features for SOM (numerical features)

features = ['n\_adults', 'n\_children', 'weekend\_nights', 'week\_nights', 'lead\_time', 'avg\_room\_price']

# Normalize the data

scaler = MinMaxScaler()

data = scaler.fit\_transform(hotel\_data[features])

# Initialize and train the SOM

som\_dim = (20, 20) # Increase grid size to 20x20

som = MiniSom(som\_dim[0], som\_dim[1], len(features), sigma=0.3, learning\_rate=0.5)

som.random\_weights\_init(data)

som.train\_random(data, 500) # Increase the number of iterations

# Plot the U-Matrix (distance map)

plt.figure(figsize=(10, 10))

plt.pcolor(som.distance\_map().T, cmap='Blues') # Plot distance map as a heatmap

plt.colorbar()

# Overlay data points on the U-Matrix

for i, x in enumerate(data):

w = som.winner(x)

plt.plot(w[0] + 0.5, w[1] + 0.5, 'o', markerfacecolor='None',

markeredgecolor='r', markersize=12, markeredgewidth=2)

plt.title('U-Matrix of Hotel Data with Data Points')

plt.show()