**HARDIK KHARE | 70765344**

**HW 6.1 -  Chained K-Nearest-Neighbor Clusters (50 points)**

An epidemic is breaking out in a region containing M cities, and quarantine partitions are needed based on the likely spread of the disease.  **You are asked to write a program that clusters the cities into K clusters (with K being a variable parameter indicating the number of quarantined partitions) such that if a city is closest to some other city, then those cities are part of the same quarantine group.**

Using Euclidean distance as a measure of closeness between points, the following cities would be clustered as follows (with varying K)…

original data:                        K=2 clusters:

Chart, scatter chart

Description automatically generated    A picture containing diagram

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K=3 clusters:                        K=4 clusters:

A picture containing diagram

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**Section 1: Successful compilation of programTable

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**Section 2: program running on the provided example from the assignmentTable

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**Section 3: Provided test input**

*~ No Test Input provided on Piazza ~*

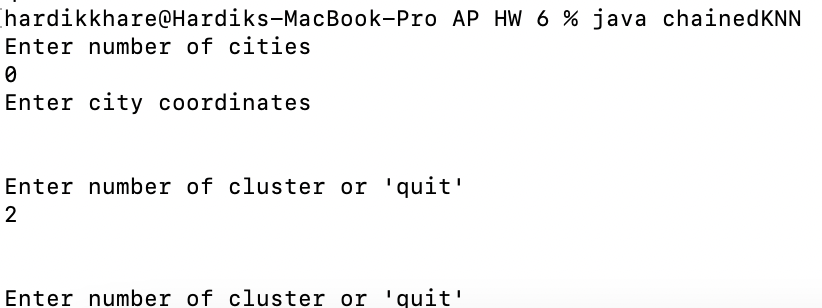
**Section 4: Edge Case #1  
Description:** Number of cluster is more than numbers of points **Input: Num points : 15; Num clusters 20**

**Expected Output: We should get 15 clusters as that is max number of cities**

Table

Description automatically generated

**Section 5: Edge Case #2  
Description:** Number of points is 0. **Expected Output: There will be no clusters**

**Output:  
**

<https://leetcode.com/problems/number-of-closed-islands/>Bar chart

Description automatically generated with low confidence

<https://leetcode.com/problems/find-eventual-safe-states/>A picture containing timeline

Description automatically generated