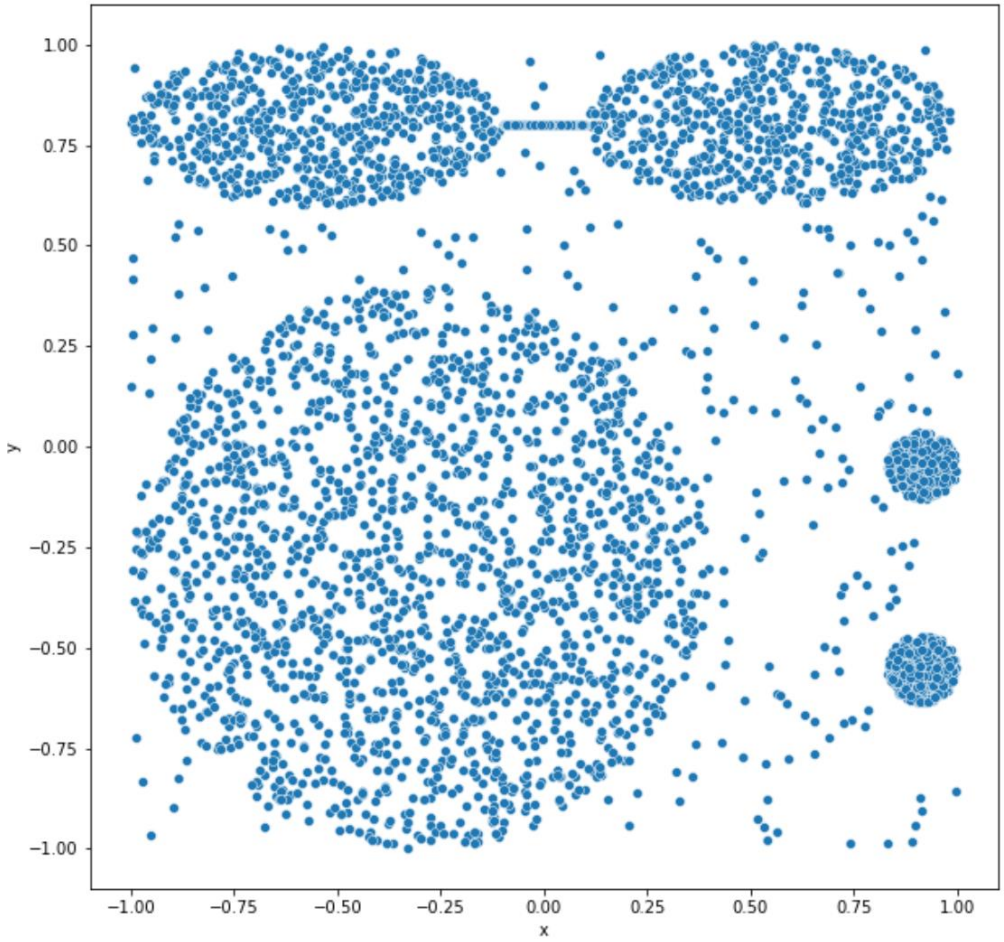
Homework Assignment 2

STAT430 Unsupervised Learning - Fall 2021

Due: Friday, September 10 on Compass

Question #1: [1.5 pt]

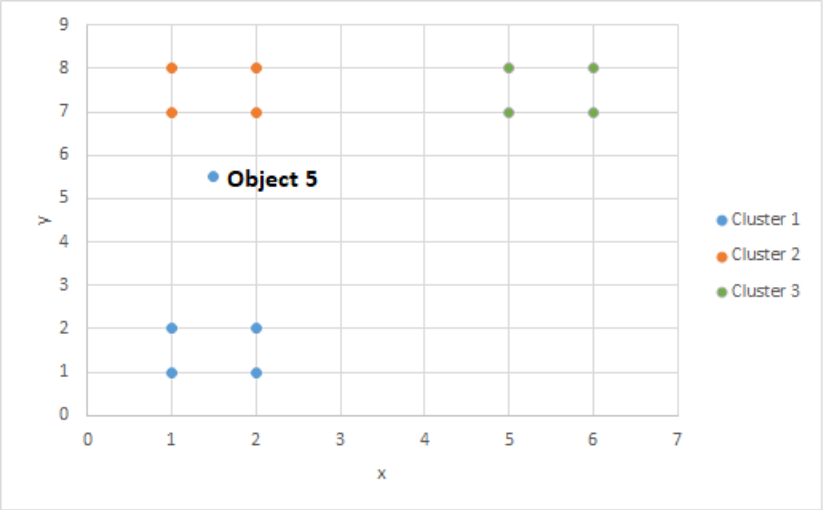
What type of cluster definition would be most useful in describing the five clusters represented in the plot shown below?



Question #2: [3 pt]

Calculate the silhouette score of object 5 using the information below. Then interpret what this silhouette score says about object 5 with respect to this clustering.

	Data			
		x	y	**Distance Object 5 is away from this object.**
Cluster 1	**Object 1**	1	1	4.53
	Object 2	2	2	3.54
	Object 3	1	2	3.54
	Object 4	2	1	4.53
	Object 5	1.5	5.5	--
Cluster 2	**Object 6**	1	7	1.58
	Object 7	1	8	2.55
	Object 8	2	7	1.58
	Object 9	2	8	2.55
Cluster 3	**Object 10**	5	7	3.81
	Object 11	5	8	4.30
	Object 12	6	7	4.74
	Object 13	6	8	5.15



Question #3: [2 pt]

Suppose we have a dataset comprised of three objects (*object 1, object 2, and object 3*). Each object has two dimensions (ie. x and y dimensions). Suppose we come up with a clustering that assigns *objects 1 and 2* to cluster 1 and *object 3* to cluster 2 (see below). Come up with an example of (x,y) values for *objects 1, 2, and 3* below such that *object 2* has a silhouette score of exactly 0. *(Ie: fill in the blanks below).*

Clustering:

Cluster 1:

Object 1: (_____, _____)

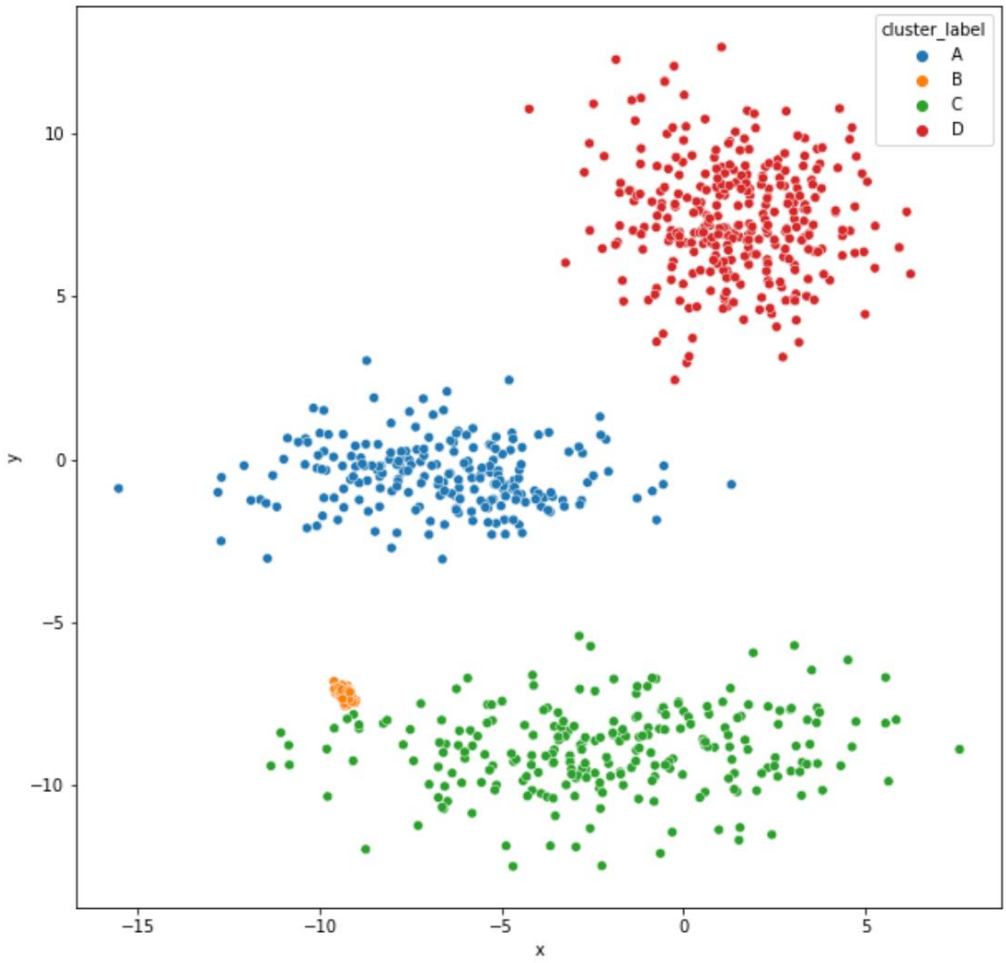
Object 2: (_____, _____)

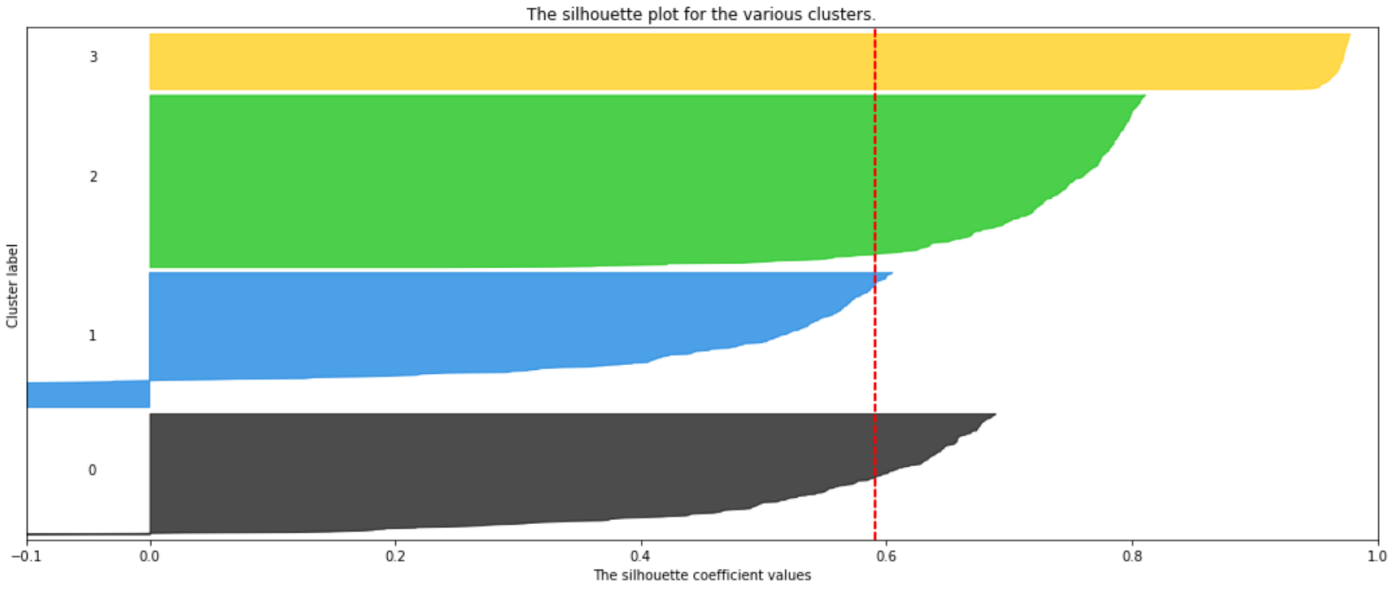
Cluster 2:

Object 3: (_____, _____)

Question 4: [4 pt]

The silhouette plot below was created from the following clustering and dataset shown in the scatterplot below. Match the cluster labels (A-D) shown in the scatterplot to the corresponding cluster labels (0-3) in the silhouette plot. Explanations are not required, but may help with partial credit if you get something wrong.





Question #5:

1. Download the Assignment_02.zip file from Compass.
2. Edit the Jupyter notebook (.ipynb) file to complete/answer questions for question 5.
3. Submit your completed Jupyter notebook (.ipynb) file as well as any other files you used to answer Question 1-4 to compass.