Name: _____ USC ID: _____

INF 553 – Spring 2018

Quiz 7: K-means clustering (10 points), **15 minutes**

Consider clustering the following 2-dimensional data points using the k-means algorithm with **k = 3**. Suppose the algorithm will run until the centroids do not change any more.

a = (0,0), b = (4,0), c = (5,0), d = (0,2), e = (0,3)

1. [8 points] Suppose the initial centroids are points: **a, b, and d**. Show the point assignments and new centroids at each iteration of the algorithm.

   1st iteration:

centroid:	points:
a(0,0)	a
b(4,0)	b,c
d(0,2)	d,e

   2st iteration:

centroid:	points:
(0,0)	a
(4.5,0)	b,c
(0,2.5)	d,e

2. [2 points] Is there another set of initial centroids which will produce different clusterings? If yes, state what they are and the new clustering they will produce. If not, explain why not.

   Yes

   1st iteration:

centroid:	points:
a(0,0)	a,b,c
d(0,2)	d
e(0,3)	e

   2st iteration:

centroid:	points:
(3,0)	b,c
(0,2)	a,d
(0,3)	e

   3st iteration:

centroid:	points:
(4.5,0)	b,c
(0,1)	a,d
(0,3)	e

Or {a,b,c} and other reasonable solutions will be accepted