

FINAL EXAM: Problem 3

STAT 472, Spring 2020

(4 points) Consider clustering the six points

$$p_1 = (x_1, y_1), p_2 = (x_2, y_2), p_3 = (2.5, 0), p_4 = (3.5, 0), p_5 = (0, 3), \text{ \& } p_6 = (0, 5)$$

using agglomerative clustering with centroid linkage and Euclidean distance. Give values for x_1 , y_1 , x_2 , and y_2 such that

first p_1 and p_2 are fused,

then p_3 and p_4 are fused,

then p_5 and p_6 are fused,

then the cluster $\{p_3, p_4\}$ and the cluster $\{p_5, p_6\}$ are fused,

and finally the cluster $\{p_3, p_4, p_5, p_6\}$ and the cluster $\{p_1, p_2\}$ are fused with an *inversion* being created (meaning that the distance between $\{p_3, p_4, p_5, p_6\}$ and $\{p_1, p_2\}$ is less than the distance between two clusters which were previously fused).

(*Note:* There is more than one correct set of values for x_1 , y_1 , x_2 , and y_2 . Make sure that the values you provide satisfy all of the conditions given above.)