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**1: k-means**

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**Problem:** Use k-means with  $k=2$  and  $k=3$  to cluster the data. When using  $k=2$ , start with data points 9 and 15 as initial seeds. When using  $k=2$ , start with data points 6, 9 and 15 as initial seeds.

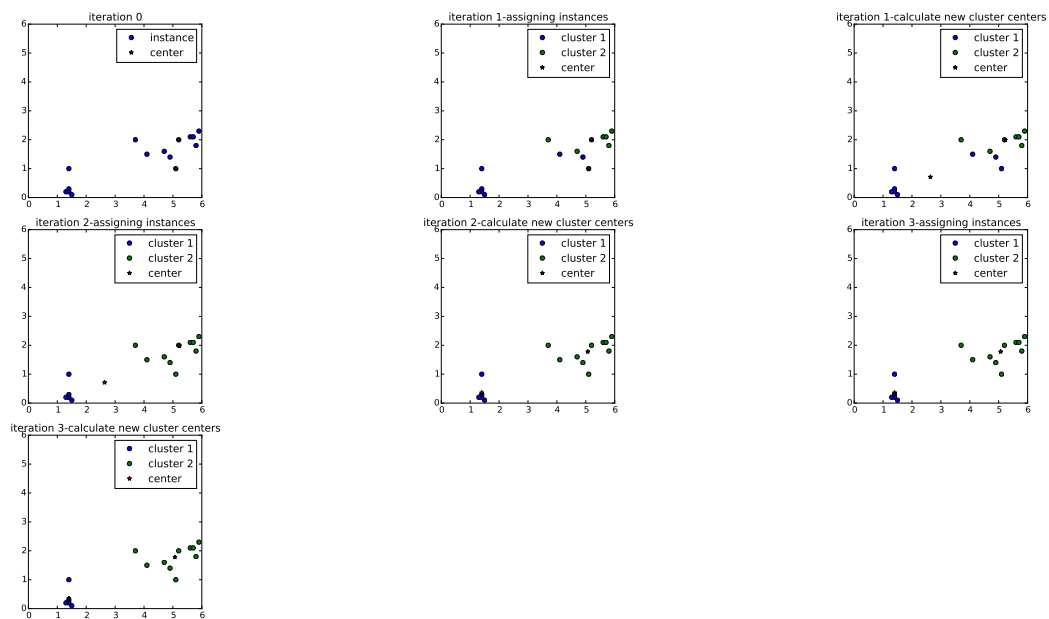
**Result:**

Figure 1:  $k=2$ , data points 9 and 15 as initial seeds

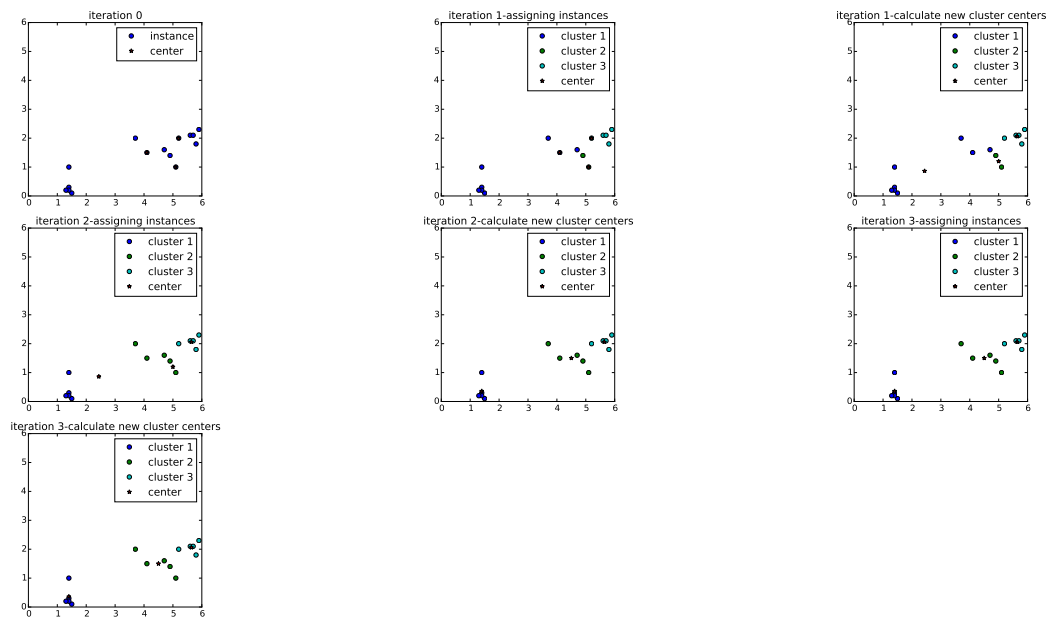


Figure 2:  $k=3$ , data points 6, 9 and 15 as initial seeds

## 2: single-link agglomerative clustering

**Problem:** Use single-link agglomerative clustering to cluster the data. From the hierarchy, identify the clusters obtained if partitioning the data into 2 clusters and if partitioning the data into 3 clusters.

**Result:**

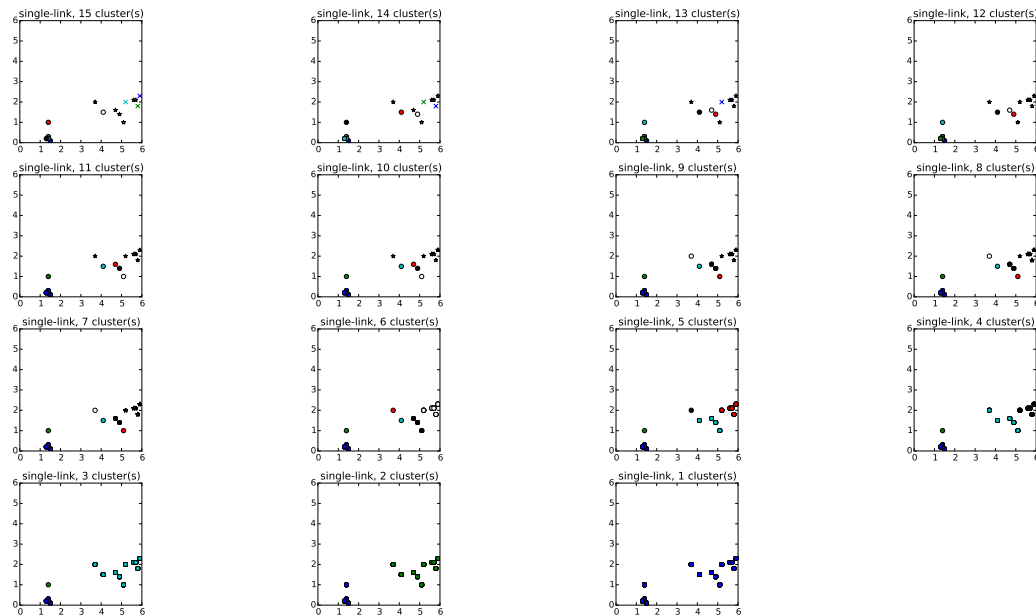


Figure 3: Single-link Agglomerative Clustering

### 3: complete-link agglomerative clustering

**Problem:** Use complete-link agglomerative clustering to cluster the data. From the hierarchy, identify the clusters obtained if partitioning the data into 2 clusters and if partitioning the data into 3 clusters.

**Result:**

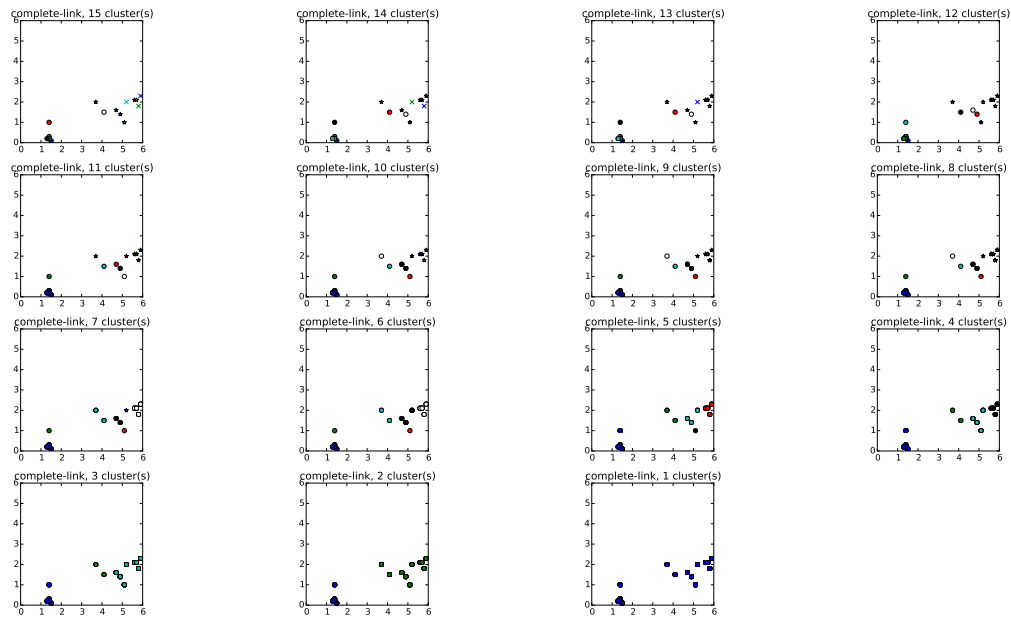


Figure 4: Complete-link Agglomerative Clustering