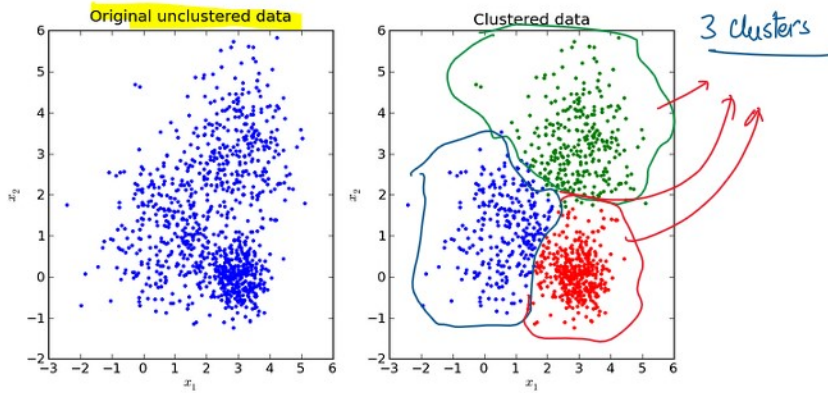


# Hierarchical Clustering

25 January 2024 07:01

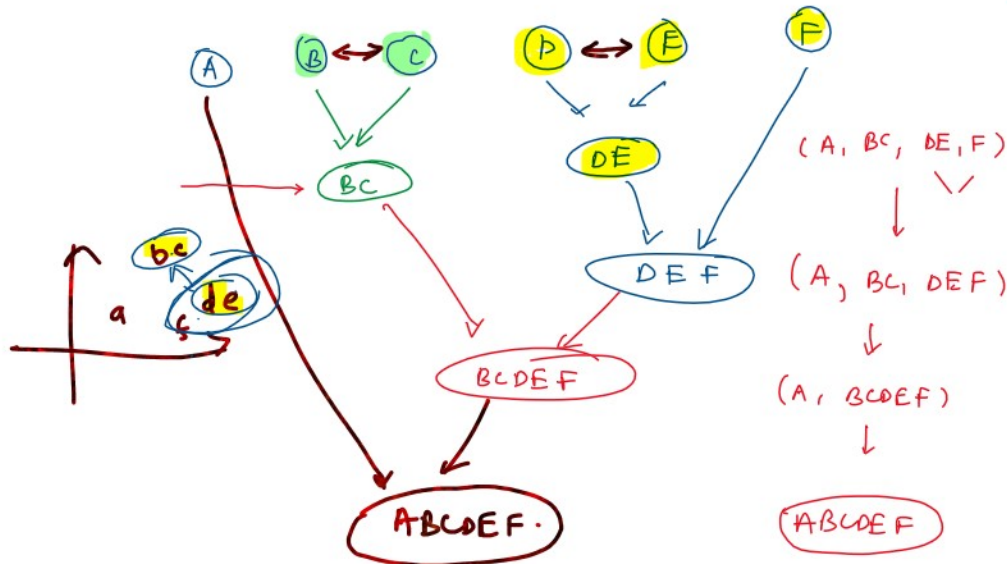


Hierarchical clustering is divided into two types:

1. Agglomerative
2. Divisive

## Agglomerative Hierarchical clustering

In here, each data point is considered to be as an individual cluster. At each iteration, the similar clusters merge with other clusters until one cluster or 'K' clusters are formed.



## Proximity Matrix:

	A	B	C	D	E	F
A	0	x	y	z	w	v
B	-	0	-	-	-	-
C	-	-	0	-	-	-
D	-	-	-	0	-	-
E	-	-	-	-	0	-
F	-	-	-	-	-	0

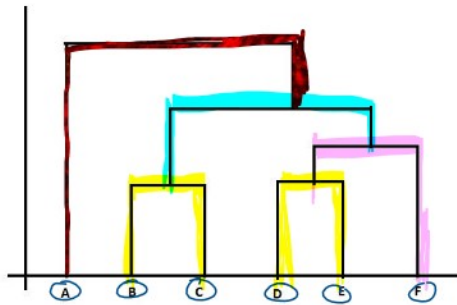
Basic algorithm of agglomerative is straight forward:

- compute the proximity matrix
- let each data point be a cluster

- repeat: merge the two closest clusters and update the proximity matrix
- until only a single cluster remains

Hierarchical clustering technique can be visualized using a **dendrogram**

↓  
a dendrogram is like a tree diagram that records the sequence of merges or splits

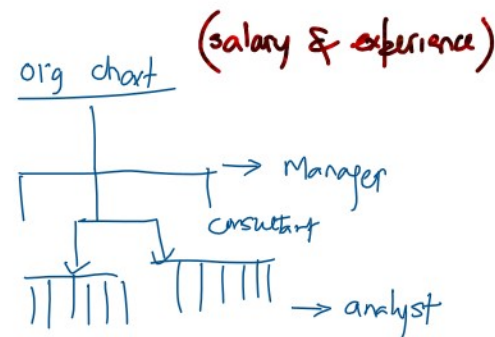


### #2 Divisive Hierarchical clustering Technique:

It is exactly the opposite of Agglomerative hierarchical clustering. In this, we consider **all data points as a single cluster** and in each iteration, we separate the data points from the cluster which are not similar.

### Applications

- ① Business: divide customers into segments or forming **a hierarchy of employees based on salary.**



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