

The background of the slide is a complex, abstract composition. It features a dark, reddish-brown base with a network of thin, light-colored lines forming a triangular mesh. Overlaid on this are various data visualizations: a grid of small, light-colored crosses in the top-left and bottom-left corners; a series of horizontal, semi-transparent bars in the top-left; a large, dense cluster of small, colored dots (green, blue, yellow) in the center; and a large, semi-transparent, light-colored shape in the center-right. The overall aesthetic is technical and data-driven.

Basic Concepts of Hierarchical Algorithms

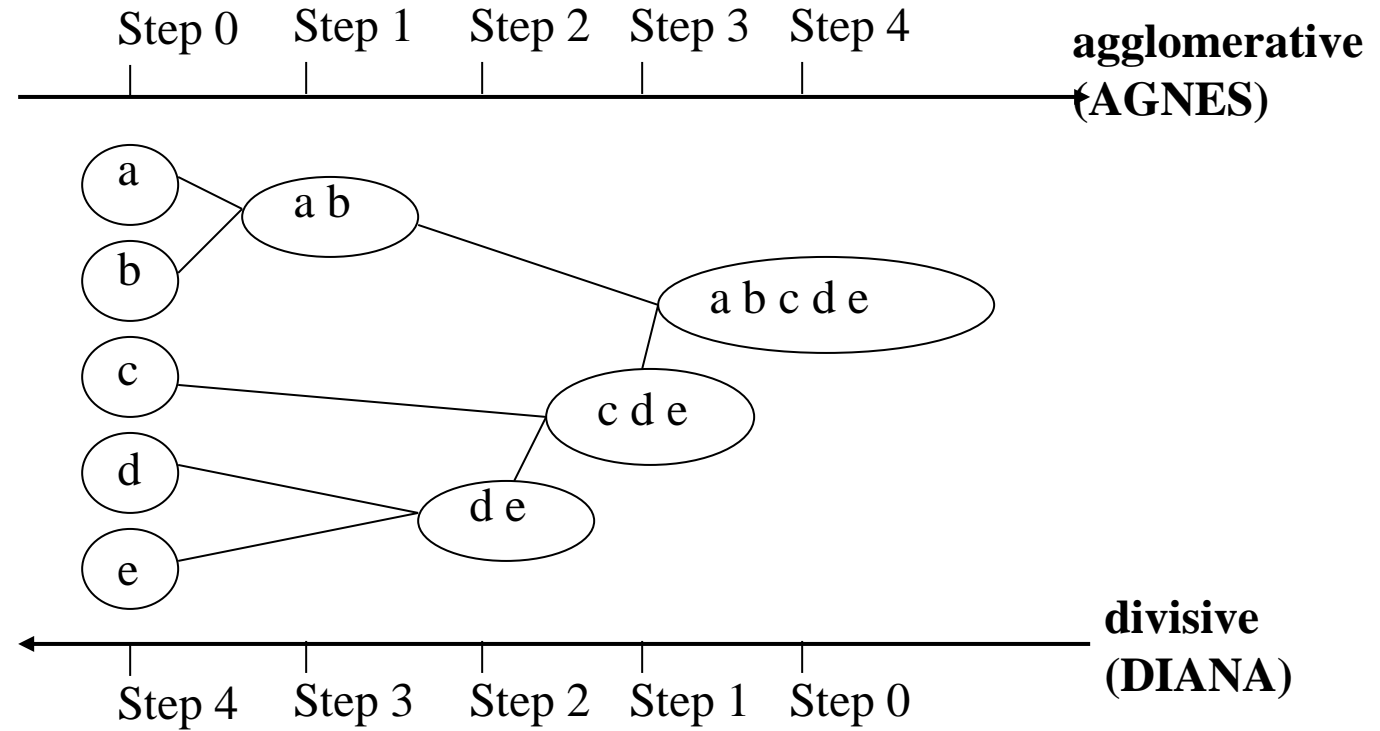
Hierarchical Clustering: Basic Concepts

❑ Hierarchical clustering

- ❑ Generate a clustering hierarchy (drawn as a **dendrogram**)
- ❑ Not required to specify **K**, the number of clusters
- ❑ More deterministic
- ❑ No iterative refinement

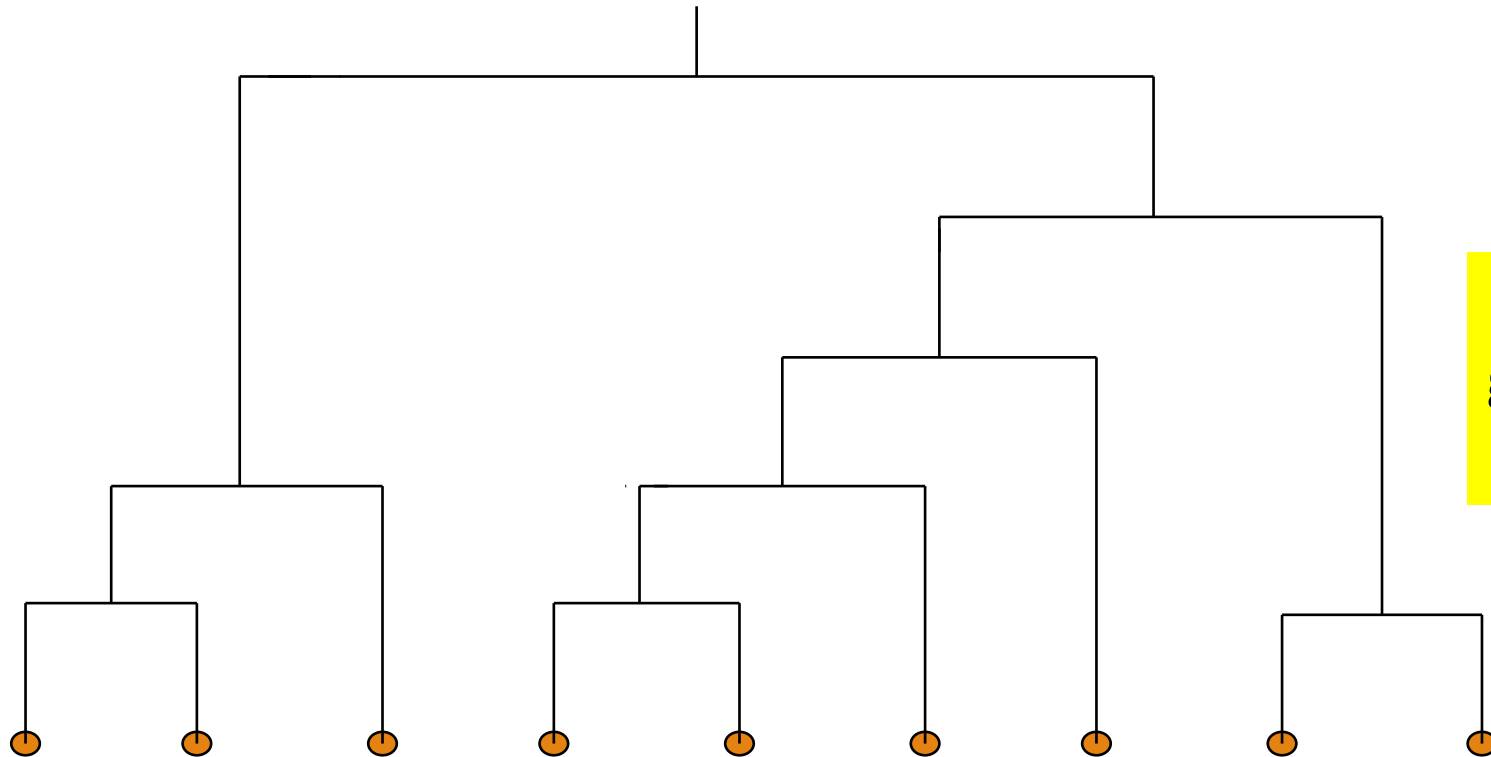
❑ Two categories of algorithms:

- ❑ **Agglomerative**: Start with singleton clusters, continuously merge two clusters at a time to build a **bottom-up** hierarchy of clusters
- ❑ **Divisive**: Start with a huge macro-cluster, split it continuously into two groups, generating a **top-down** hierarchy of clusters



Dendrogram: Shows How Clusters are Merged

- ❑ Dendrogram: Decompose a set of data objects into a tree of clusters by multi-level nested partitioning
- ❑ A clustering of the data objects is obtained by cutting the dendrogram at the desired level, then each connected component forms a cluster



Hierarchical clustering
generates a dendrogram
(a hierarchy of clusters)