**Concept Hierarchy**

Concept hierarchies can be used to reduce the data by collecting and replacing low-level concepts with higher-level concepts.

In the multidimensional model, data are organized into multiple dimensions, and each dimension contains multiple levels of abstraction defined by concept hierarchies. This organization provides users with the flexibility to view data from different perspectives.

Data mining on a reduced data set means fewer input/output operations and is more efficient than mining on a larger data set.

Because of these benefits, discretization techniques and concept hierarchies are typically applied before data mining, rather than during mining.

**Concept Hierarchy Generation for Numerical Data**

**Typical methods**

**1 Binning**

Binning is a top-down splitting technique based on a specified number of bins.Binning is an unsupervised discretization technique.

**2 Histogram Analysis**

Because histogram analysis does not use class information so it is an unsupervised discretization technique.Histograms partition the values for an attribute into disjoint ranges called buckets.

**3 Cluster Analysis**

Cluster analysis is a popular data discretization method.A clustering algorithm can be applied to discrete a numerical attribute of A by partitioning the values of A into clusters or groups.

Each initial cluster or partition may be further decomposed into several subcultures, forming a lower level of the hierarchy.