

Nodes placed relatively close to each other are perceived as groups. Most visualization methods for **CLUSTERED GRAPHS** based on node-link diagrams rely on this intuition [13]

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The notion of the **UNIFORM EDGE LENGTH** is connected to the proximity principle: for unweighted graphs the distance between any two adjacent nodes should be the same [5]

## proximity prox i mity

elements that are close to each other are perceived as groups **FORCE-DIRECTED** algorithms are based on the proximity principle: pairs of adjacent nodes should be relatively close to each other, while non-adjacent nodes should be far [3]

**PROXIMITY DRAWINGS**, where two nodes are adjacent if and only if they are in a certain proximity relation [12], explicitly rely on the proximity principle; for example, in **GABRIEL DRAWINGS** two nodes are adjacent if and only if the circle with diameter defined by the two nodes is empty





**UNIFORM EDGE LENGTH** [5] employs the principle of similarity to indicate similar relations between adjacent nodes

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similarity

similar elements, e.g. by shape, color, appear to be grouped together Similarly directed **UPWARD** edges [4] indicate similar hierarchical relations between the corresponding pairs of nodes

Nodes with the same **COLOR** indicate they belong to the same cluster; nodes of the same **SIZE** indicate they have equal importance; nodes

with the same **SHAPE** indicate similar properties [1]



## **Gestalt Principles in Graph Drawing**

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**ABSTRACT** Gestalt principles are rules of the organization of perceptual scenes. They were introduced in the context of philosophy and psychology in the 19th century and were used to define principles of human perception in early 20th. The Gestalt (form, in German) principles include among others the grouping of closely positioned objects (proximity), the grouping of objects of similar shape or color (similarity), the grouping of objects that form a continuous pattern (continuation), and the grouping of objects that form symmetric patterns (symmetry). Gestalt principles have been extensively applied in design of user interfaces, in graphic design, information visualization, etc. Several graph drawing conventions and aesthetics seem to rely on Gestalt principles. In this poster we investigate these relations.

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The symmetry principle suggests that symmetrical components tend to be grouped together; symmetry



Global graph symmetries have been studied in terms of graph **AUTOMORPHISM GROUPS** [12] but are difficult to measure [9]

is a property of node-link diagrams that is highly preferable by humans [6]; human perception of symmetry in graph drawing has been considered in user studies [9]



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