

## Graph

A **graph** (sometimes called an *undirected graph* to distinguish it from a [directed graph](#), or a *simple graph* to distinguish it from a [multigraph](#))<sup>[4][5]</sup> is a [pair](#)  $G = (V, E)$ , where  $V$  is a set whose elements are called *vertices* (singular: *vertex*), and  $E$  is a set of paired vertices, whose elements are called *edges* (sometimes *links* or *lines*).

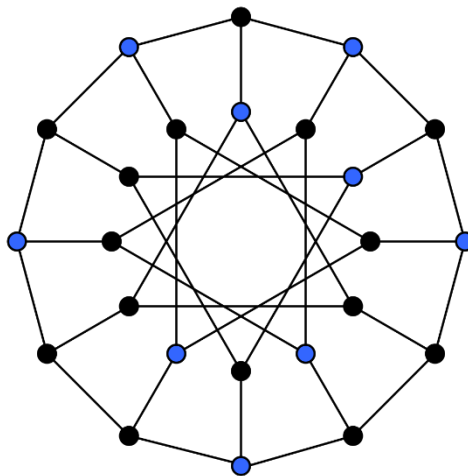
The vertices  $x$  and  $y$  of an edge  $\{x, y\}$  are called the *endpoints* of the edge. The edge is said to *join*  $x$  and  $y$  and to be *incident* on  $x$  and  $y$ . A vertex may belong to no edge, in which case it is not joined to any other vertex.

## Graph theory

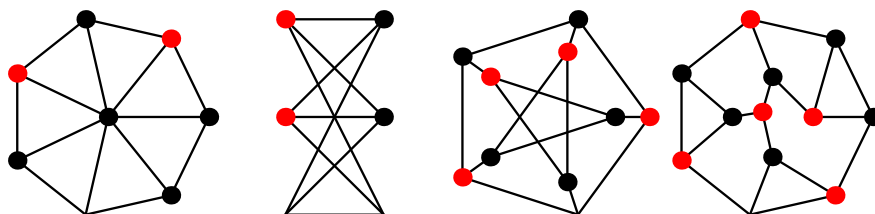
**Graph theory** is the study of [graphs](#), which are mathematical structures used to model pairwise relations between objects.

## Independent set

An **independent set**, **stable set**, **coclique** or **anticlique** is a set of [vertices](#) in a [graph](#), no two of which are adjacent.



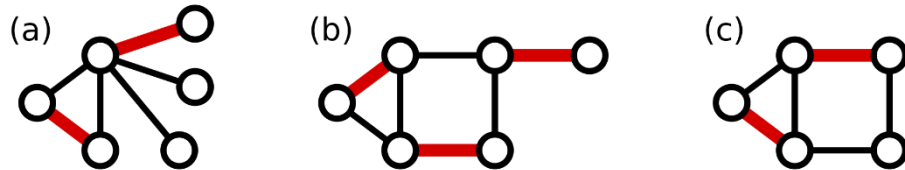
A **maximal independent set (MIS)** or **maximal stable set** is an [independent set](#) that is not a [subset](#) of any other independent set. In other words, there is no [vertex](#) outside the independent set that may join it because it is maximal with respect to the independent set property.



## Matching

A **matching** (or **independent edge set**) in an undirected [graph](#) is a set of [edges](#) without common [vertices](#).<sup>[1]</sup> In other words, a subset of the edges is a matching if each vertex appears in at most one edge of that matching.

A **maximum matching** (also known as maximum-cardinality matching<sup>[2]</sup>) is a matching that contains the largest possible number of edges. There may be many maximum matchings.



## Vertex cover

A **vertex cover** (sometimes **node cover**) of a [graph](#) is a set of [vertices](#) that includes at least one endpoint of every [edge](#) of the graph.

The **minimum vertex cover problem** is the [optimization problem](#) of finding a smallest vertex cover in a given graph.

