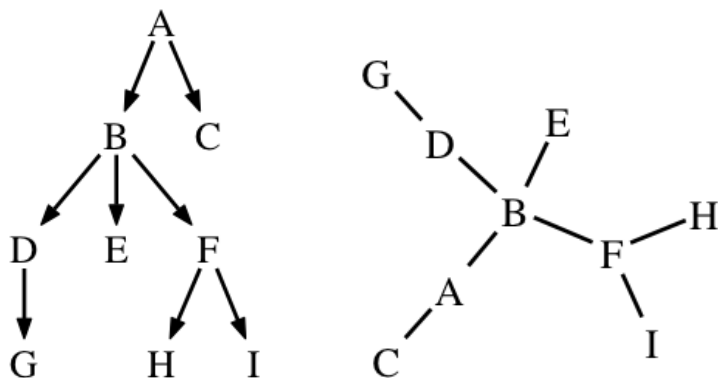


Tree

A tree is a connected [graph](#) in which there are no [cycles](#). This implies that between any two [nodes](#), there is only a single [path](#).

In a directed tree (below left), it is also required that no node has [indegree](#) greater than one, i.e., that no node has more than one [edge](#) pointing to it. Therefore, it is possible that a directed graph has no [cycles](#) but it is not a directed tree – for example, consider the graph obtained by inverting the direction of all the edges in the graph below. A directed tree always has exactly one [root](#) (a node that has no edges pointing to it). Below, node A is the root.

An undirected tree (below right) can always be directed by picking one of the nodes as the root and orienting all edges away from it. Picking node A as the root in the undirected graph below yields the directed tree on the left.



Nodes that have [degree](#) one are called [leaf nodes](#) (C,G,E,H,I above). The other nodes are called [internal](#) (or interior) [nodes](#) (A,B,D,F above).

A directed tree is *bifurcating* if the [outdegree](#) of each node is either zero or two. An undirected tree is bifurcating if all nodes have [degree](#) either three or one. Nodes whose degree exceeds the said limit (for directed trees two and for undirected trees three) are called *multifurcating*, an example being node B above with outdegree three and degree four.

A [stemma](#) is often a tree, although occasionally loops are introduced in the graph (which will then become a [DAG](#)) in order to represent instances of [contamination](#). It is customary to associate extant manuscripts with the leaf nodes, in which case the interior nodes represent extant ancestors (whose descendants are then *codices descripti*) or hypothetical lost manuscripts which may remain unlabeled.

In other languages

DE: Baum
FR: arbre
IT: albero

[TR](#), [VM](#), [KH](#)