Basic definitions-II

(vi) Planar and Non-planar graphs: A graph is said to be planar if it can be drawn on a plane surface such that no two branches cross each other.

A non – planar graph can not be drawn on a plane surface without a crossover

(vii) Tree and Co-tree:

Tree:

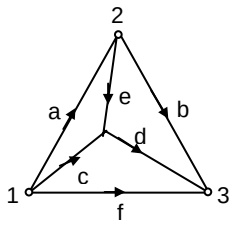
A tree is a connected sub graph of a network which consists of all the nodes of the original graph but no closed paths. The number of nodes in the graphs is equal to the number of nodes in the tree.

Co-tree:

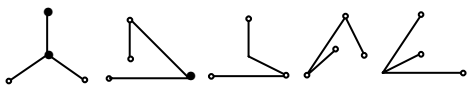
It is a sub graph which is formed after disconnecting a tree from the given graph.

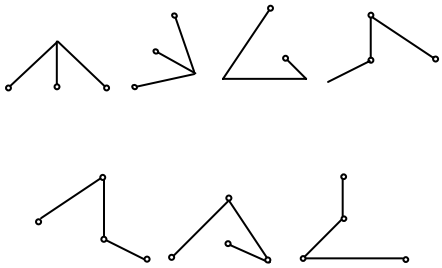
Examples:

Eg 1. For the given graph shown in figure, draw the number of possible trees

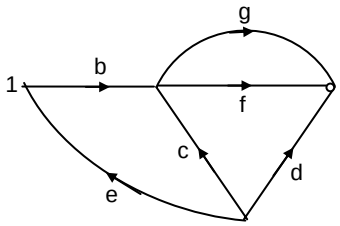


Sol. There are four nodes. The possible trees are shown in the figure

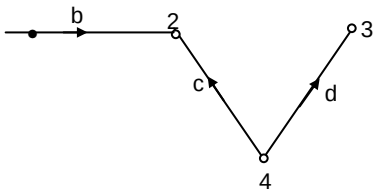


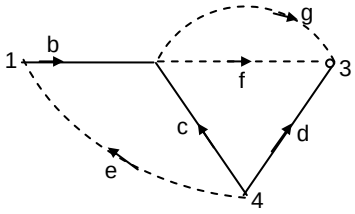


Twigs and Links: The branches of a tree are called its 'twigs'. For a given branch, the complementary set of branches of the tree is called the co-tree of the graph. The branches of co-tree are called links, i.e., those elements of the connected graph that are not included in the tree links and forms a sub graph.



For the graph shown in the figure consider the tree branches are (b, c, d) as shown in figure.





The set of branches (e, f, g) represented by dotted lines form a co – tree of the graphs. These branches are called links of this tree.

For a network with 'b' branches and 'n' nodes, the number of twigs for a selected tree is (n – 1) and the number of links 'ℓ' with respect to this tree is b – n + 1. The number twigs is called the rank of the tree