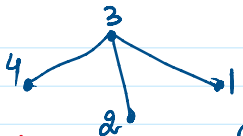
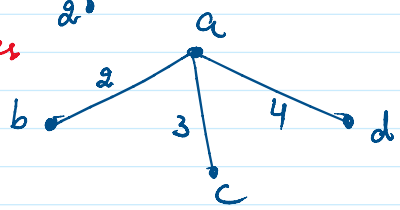
D2014 16.11.20
Monday, November 16, 2020 2:14 PM

Labeled Tree :→ A tree is said to be labeled if every Vertex is assigned a Unique numbers Called Label.

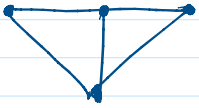


Weighted Tree :→ Every Edge is assigned a number



Spanning Tree :→ Let G be a Connected graph, a subgraph T of G is called a spanning tree if T is a tree and T Contain all the Vertices of G.

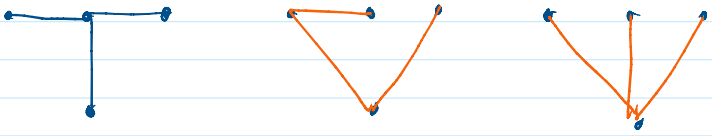
Ex



G.

No. of Vertices = 4

No. of Edges in Tree = n-1 = 4-1 = 3



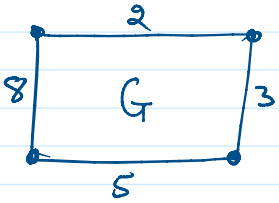
Spanning Tree of G

Note :→ The Spanning Tree of a graph is not Unique.

Minimal Spanning Tree :→ A minimal spanning tree of a weighted graph is a spanning tree with the Condition that Sum of weight of tree is as small as possible.

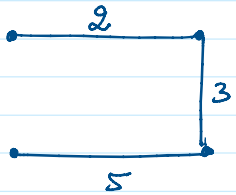
Maximal Spanning Tree :→ - - - - - - - - as Large as Possible.

Ex



No. of edges in a Tree = n-1

n = 4 Edges = 4-1 = 3



Minimal sp. tree

Weight = 2+3+5 = 10

Maximal Sp. Tree

Weight = 8+5+3 = 16

Note :→ ① A graph G is Connected iff it has a Spanning tree.

② Cayley Theorem :→ A Complete graph K_n has $(n)^{n-2}$ different

② Cayley Theorem :→ A Complete graph K_n has $(n)^{n-2}$ different Spanning Tree.

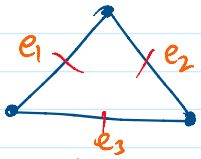
n = No. of Vertices

Ex: The number of diff. spanning tree in a Complete graph with 5 vertices is K_5

(a) 25 (b) ✓ 125 (c) 625 (d) None of these.

$n = 5$ $\quad (n)^{n-2} = (5)^{5-2} = 5^3 = 5\times5\times5 = 125$

Ex: K_3



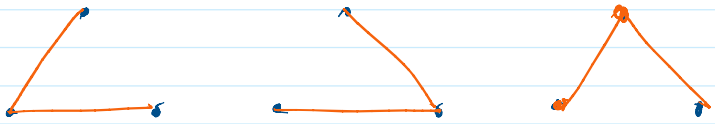
Edges = 3

$n = 3$

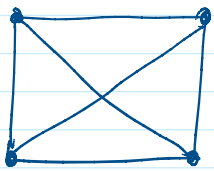
No. of S.T $= n^{n-2} = 3^{3-2} = 3^1 = 3$

No. of Vertices $n = 3$

No. of Edges $= n-1 = 3-1 = 2$ ✓



K_4

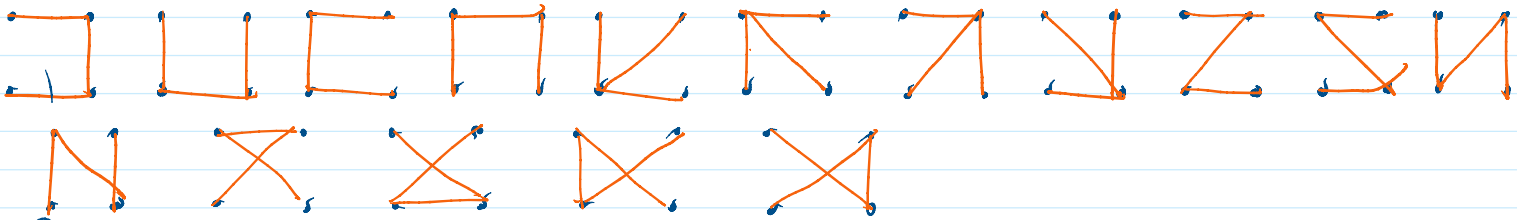


$n = 4$ $\quad$ No. of diff S.T $= n^{n-2} = 4^{4-2} = 4^2 = 16$

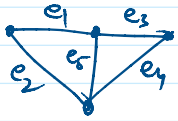
$n = 4$

No. of Edges in S.T $= 4-1 = 3$

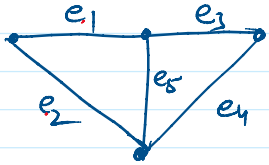
No. of Edges in $K_4 = 6$



Ex: How many S.T the graph

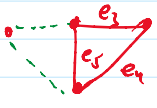


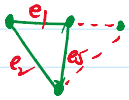
can have.



Sol: No. of Vertices $= n = 4$

No. of Edges $= 5$





For a Tree we need: No. of Edges $= n-1 = 4-1 = 3$

∴ we have to remove 2 edges out of 5.

∴ No. of ways $= {}^5C_2 = 10$

(But by removal of Two edges, the graph should not be disconned or have a Cycle)

∴ No. of ways $= {}^5C_2 = 10$

(But by removal of Two edges, the graph should not be disconned or have a cycle)

∴ By the removal of e_1, e_2 and e_3, e_4 the graph become disconnected.

∴ Total no. of S.T $= 10 - 2 = 8$