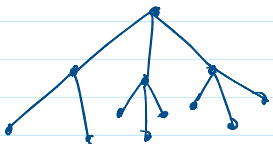
D2014 11.11.20

Wednesday, November 11, 2020 2:05 PM

m-array Tree :→ A tree is called m-array tree if every vertex of the tree has atmost m-offsprings (childs)

a



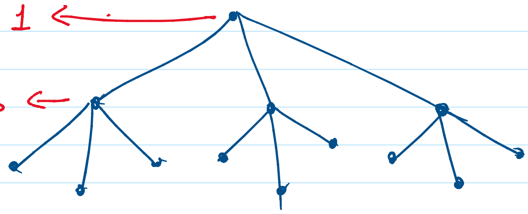
3 - array tree.

Complete m-array tree :— ———— if Every Vertex has Excatly m-offspring

$3^0 = 1$ ←

$3^1 = 3$ ←

$3^2 = 9$

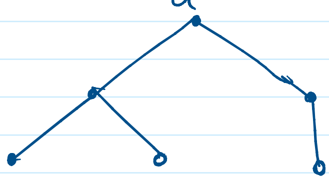


Complete 3-array tree.

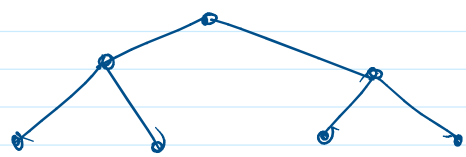
Binary - Tree ⟶ 2-array Tree

Complete Binary Tree ⟶ Complete 2-array tree.

a



Binary tree



Complete Binary Tree.

$2^0 \quad 2^1 \quad 2^2 \quad 2^3 \quad 2^4 \quad 2^5 \quad 2^6$ ------

1, 2, 4, 8, 16, 32, 64 ---- G.P

$a = 1, \quad r = 2$

Level 0, 1, 2, 3, 4, 5, 6 ------

Note: No. of Vertices in a Complete Binary Tree at n^{th} Level $= 2^n$

The Maximum number of Vertices in a Binary Tree at n^{th} level $= 2^n$

#① The Max. No. of Vertices / Node in a $\boxed{\text{m-array}}$ Tree at the $\boxed{n^{th} \text{ level}} = m^n$

② No. of Nodes / Vertices in a Complete m-array Tree at the n^{th} level $= m^n$

Ex: Max. No. of nodes in a 4-array tree at 3rd-level are $\quad m^n \quad 4^3 = 64$

(a) 16 (b) 64 (c) 128 (d) 4

(Ex) No. of nodes in a 4-array tree at 3rd level are $\quad m^i \quad 4^3 = 64$

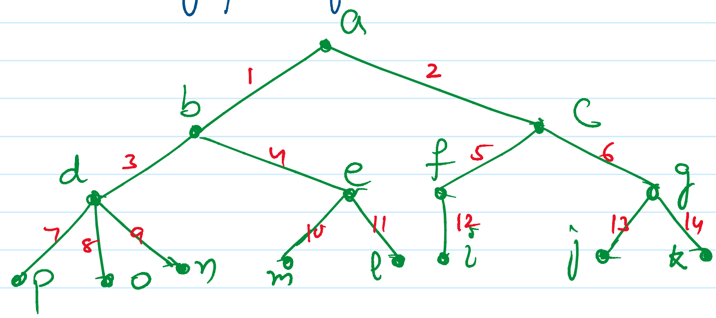
(a) 16 (b) 64 (c) 128 (d) 4

① There is One and only One path between every pair of Vertices in a Tree.
Unique.

$a \to b \to d \to n$

$a \to c \to f \to i$

$d \to b \to a \to c \to g \to k$



If in a graph G, there is a Unique path b/w every pair of Vertices, G is a Tree.

② A Tree with n-Vertices has (n-1)-edges.

n = No. of Vertices = 15
No. of edges = 14 = $(n-1)$

No. of Edges = One less than no. of Vertices

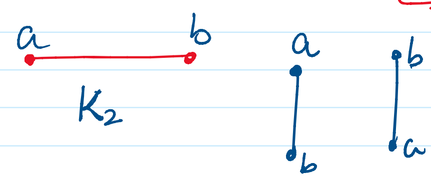
No. of Vertices = One more than no. of Edges

③ In a full/Complete m-array tree with i-Internal vertices, then No. of Vertices is given by $\boxed{n = mi + 1}$

m — m-array
i = No. of Internal Vertices
n = Total No. of Vertices

④ In any non-trivial tree, there are atleast two pendent Vertices.
↳ degree One

Trivial → No Edge
(a•) Trivial graph

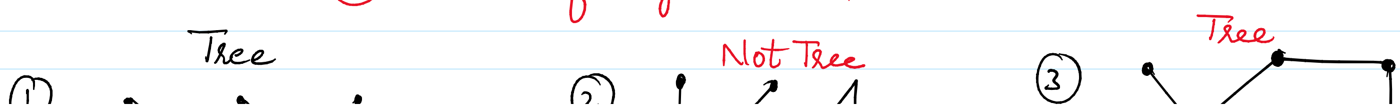


Tree

① Connected

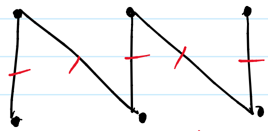
② No Cycle

③ No. of edges = $n-1$



Tree

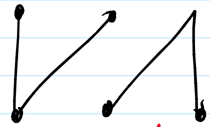
(1)



$n=6$ Edges $=5$

Not Tree

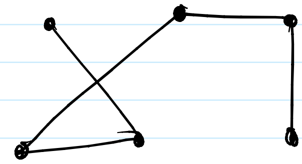
(2)



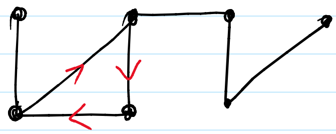
Disconnected

Tree

(3)



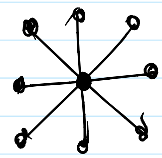
(4)



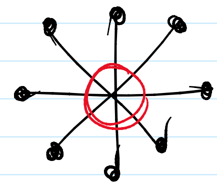
Not Tree

It has a Cycle

(5)



(6)



Disconnecte