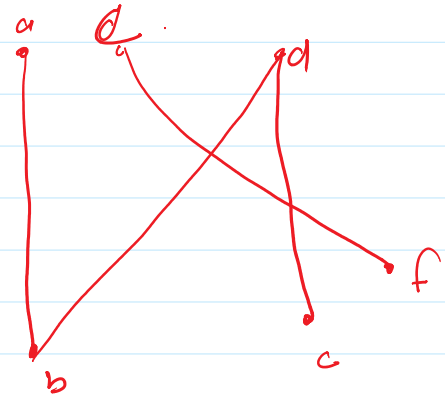
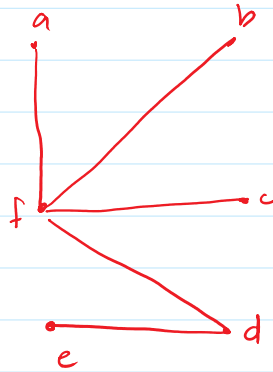


Lec # 27.

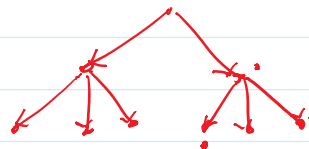
Trees.

- 1- Undirected.
- 2- Connected.
- 3- No Simple Circuit.

Ex 1 :-
624



Rooted Tree:- A tree in which one vertex is designated as the root & every edge is directed away from it.



Parent:- U is the parent of v.
the edge starts from U & ends at v.

Child:- U is the child of v.
the edge starts with v & ends at U.

Sibling:- Vertices having common parent.

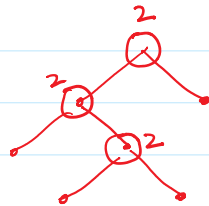
Ancutor:-

Descendants:-

Leaf:- No child.

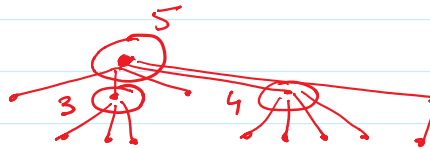
Internal Vertex:- have childs.

Ex 3
627.



2-ary tree.
= Binary "

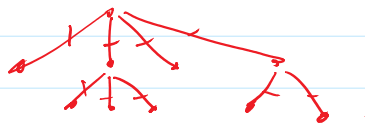
m-ary: if every internal vertex has no more than m children



5-ary tree.

Theorem 2:-
630

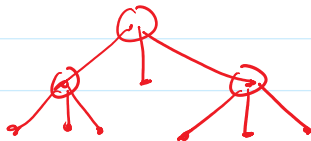
A tree with n vertices has n-1 edges.



Full m-ary tree = Every internal vertex has m children.

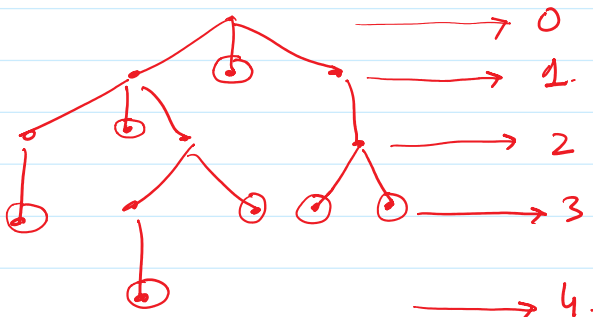
Theorem :-
630

A full m-ary tree with i internal vertices. Contain $n = mi + 1$.



$$n = 3 \times 3 + 1 = 10.$$

Height of a tree :-



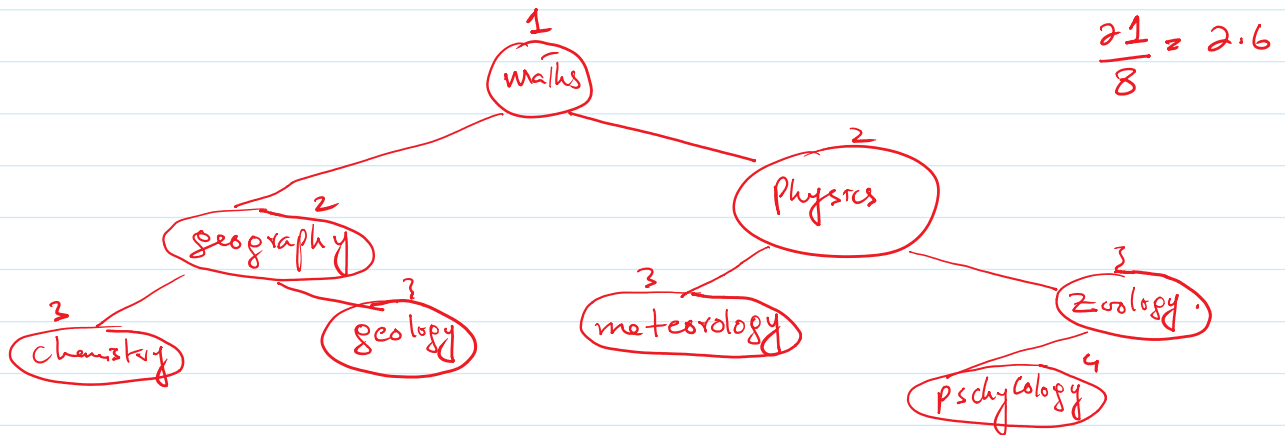
Height = 4.

Balanced tree. = 4.

Applications:-

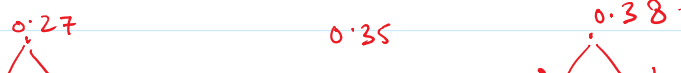
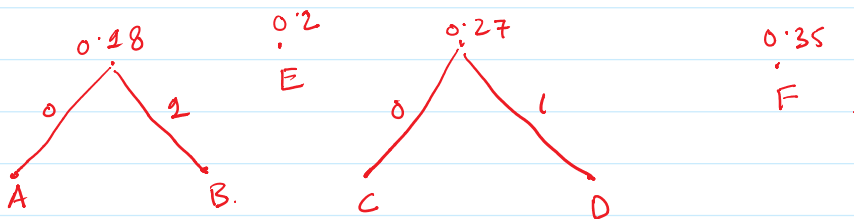
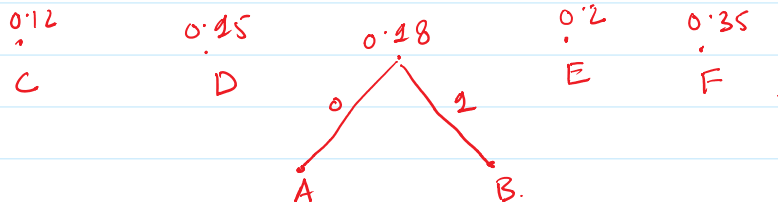
1- Binary Search tree.

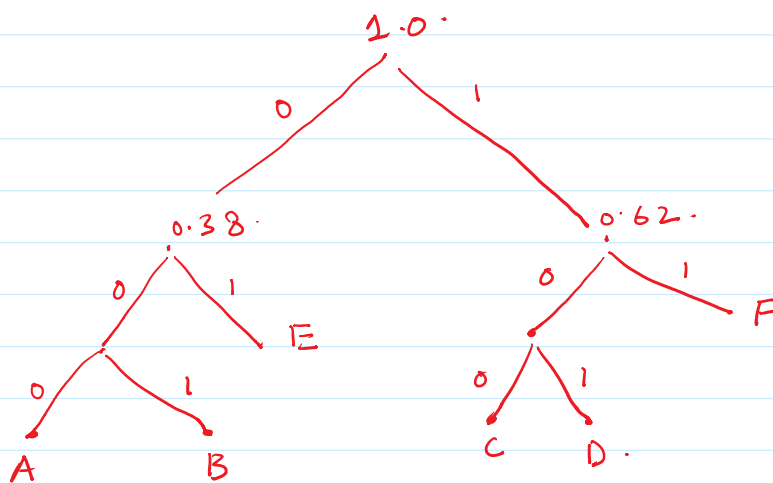
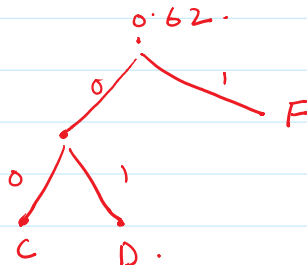
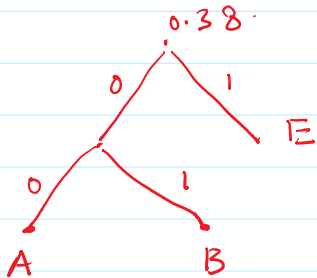
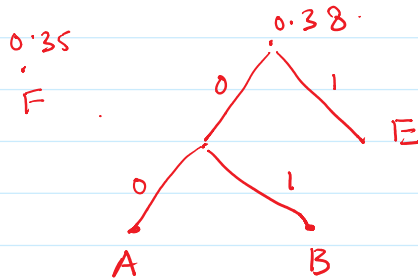
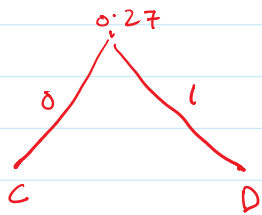
[mathematics¹, physics², geography³, zoology⁴, meteorology⁵,
geology⁶, psychology⁷, chemistry⁸].



Huffman Coding:-

0.08 0.10 0.12 0.15 0.20 0.35
A B C D E F





$\frac{16}{6} = 2.66$
 $A = 000$
 $B = 001$
 $C = 100$
 $D = 101$
 $E = 01$
 $F = 11$