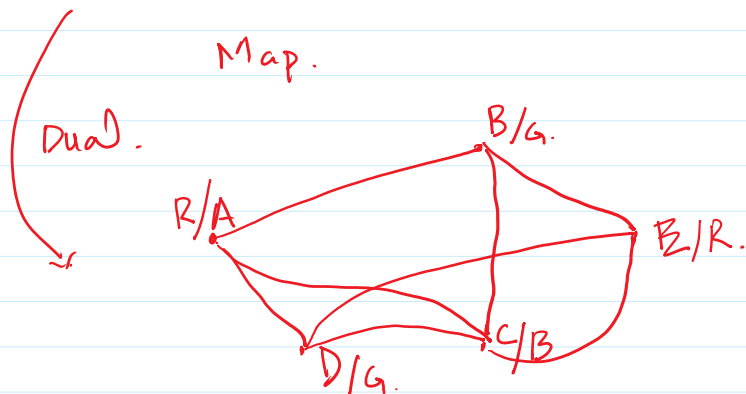# lecture 27:- GRAPH COLOURING.
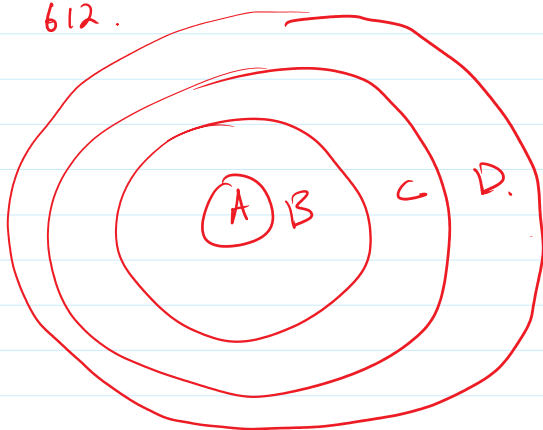

Map.

A-E = Regions.

Dual.
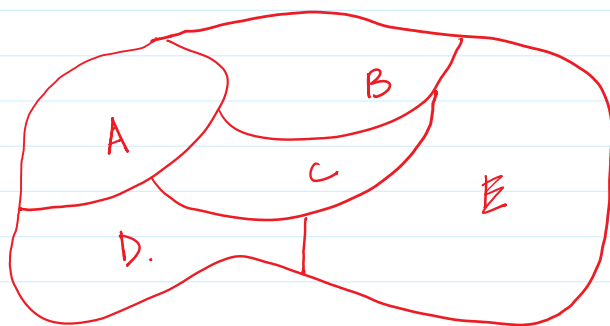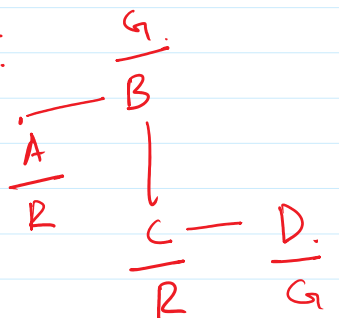

R,G,B -----⟶

CN = 3

Graph Colouring :- Assignment of Colours to Vertices Such that No two adjacent Vertices has the Same Color.

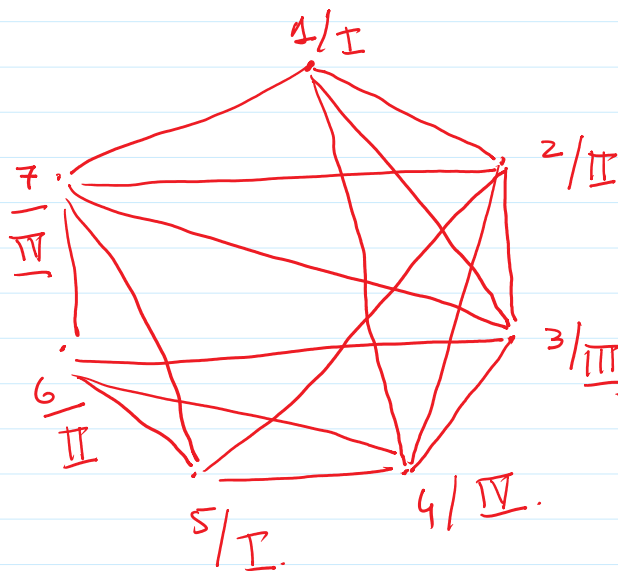**Chromatic Number:-** if we do Graph Colouring Using minimum Number of Colours.

EX:- 612.

CN = 2.

Application of Graph Colouring.
For Solving Scheduling Problems. → OS.

Ex:
① Courses.   1   ② Some Courses have Common
              ⋮   Student.
              7.

Problem: Min of Slots to Conduct Exam.

Common Students:-

1 & 2	2 & 3	3 & 4	4 & 5	5 & 6	6 & 7
1 & 3	2 & 4	3 & 6	4 & 6	5 & 7	
1 & 4	2 & 5	3 & 7			
1 & 7	2 & 7				

I, II, III, IV ---

SLOTS	Courses.
I	1, 5
II	2, 6
III	3
IV	4, 7.

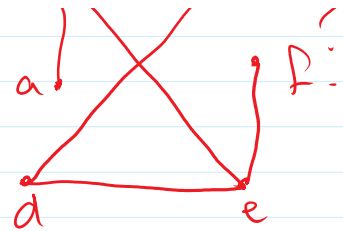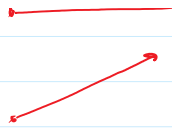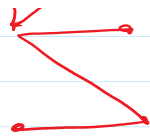CHAP-9.   TREES.   1- Connected.
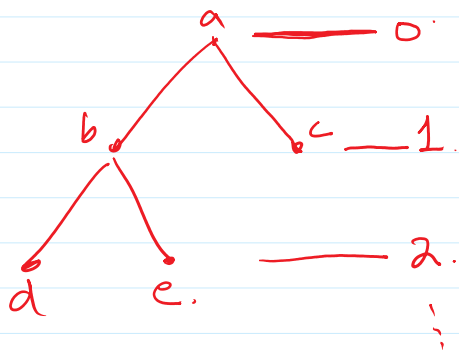
                          2- No Circuit

                          3- Undirected.
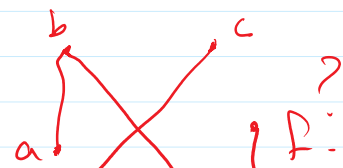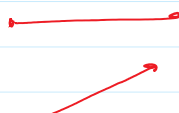
Rooted Tree :- 4 :- there is one Vertex designated as the root and every edge is directed away.
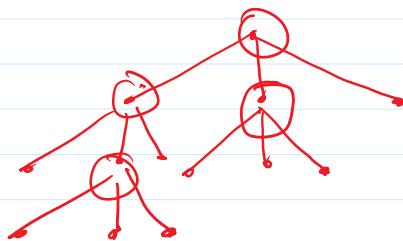

a ———— 0

b   c —— 1

d   e. ———— 2.

parent(b) = a
parent(c) = a.

child(a) = b
child(a) = c

a sibling b →.
parent(a) = parent(b).

levels :- . height of a tree = Highest level in a tree.
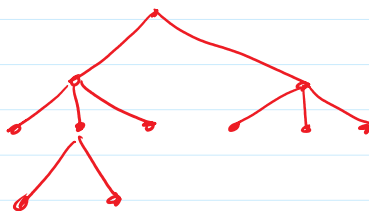
Internal Vertex; has child.

leaf Vertex :- No child.
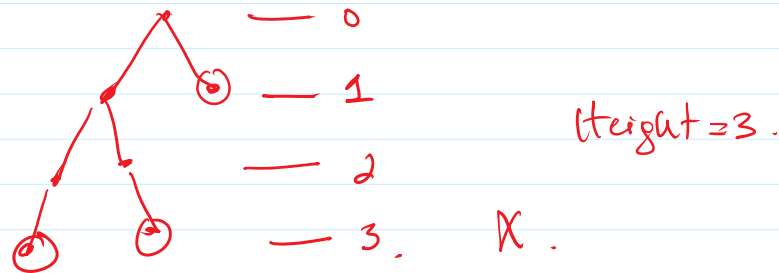

3-ary .

m-ary tree :-

Highest Number of children of any internal Vertex.

3 — ary.

2ary = Binary tree.

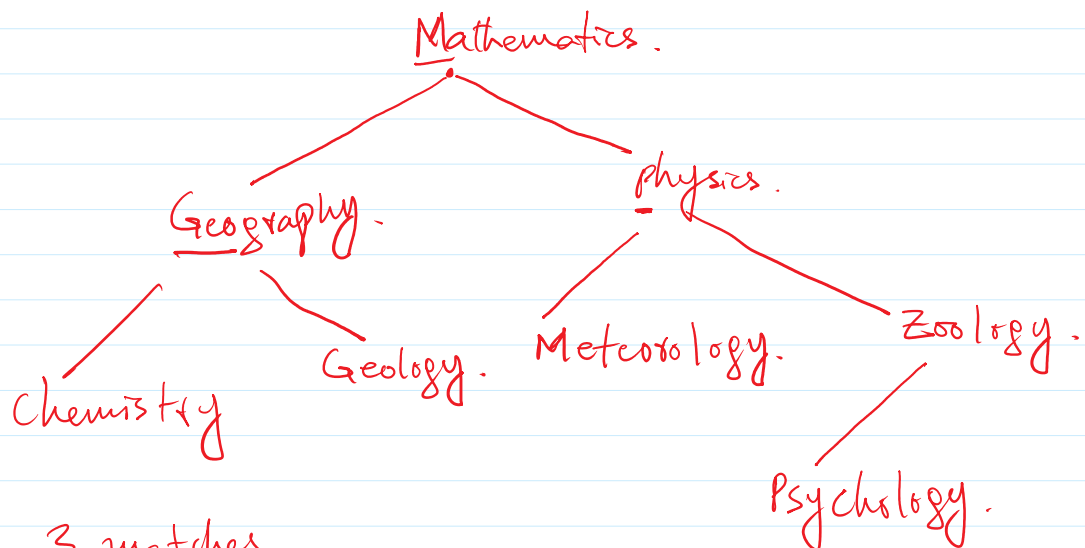Balanced tree:- if all leaf Vertices has level = height or height -1.

Height = 3.

— 0
— 1
— 2
— 3. X.

→ Edges = Vertices -1.   for any tree.

Application of Trees.

→ Binary Search Trees.   Ex1/ P636.

[Mathematics, Physics, Geography, Zoology, Meteorology, Geology, Psychology, Chemistry].
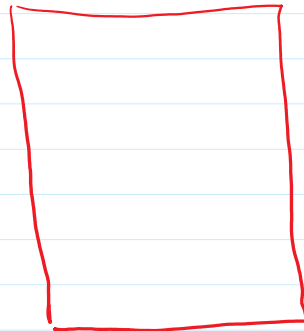
chem:- 8 matches.   Psychology: 7 matches.

Mathematics.

Geography.

physics.

Geology.

Meteorology.

Zoology.

Chemistry

Psychology.

Chemistry:- 3 matches.

psycology :- 4 matches.

HUFFMAN   CODING.

Hi

I am

here to

teach.

1 /-- 0.

Network.

X
0.08
A

X
0.10
B
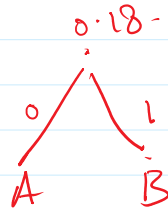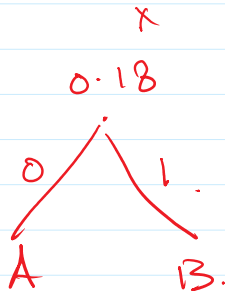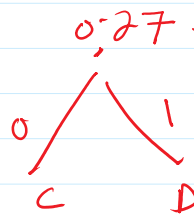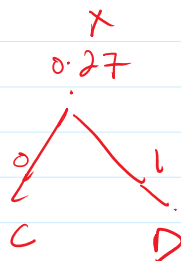
0.12
C

0.15
D

0.20
E

0.35
F

X
0.12
C

X
0.15
D

0.18
0   1
A   B

0.20
E

0.35
F

X
0.18
0   1
A   B

X
0.20
E

0.27
0   1
C   D

0.35
F

X
0.27
0   1
C   D

X
0.35
F

0.38
0   1
0   1
A   B   E

1.0
0   1

A   B

Huffman tree diagram (root splitting into 0.38 and 0.62 subtrees):

- Root node splits with 0 → 0.38 and 1 → 0.62
- 0.38 node splits with 0 → internal node, 1 → E
  - internal node splits with 0 → A, 1 → B
- 0.62 node splits with 0 → internal node, 1. → F
  - internal node splits with 0 → C, 1 → D
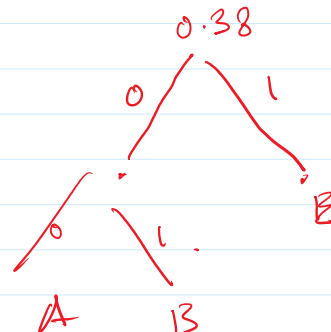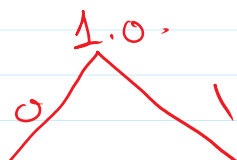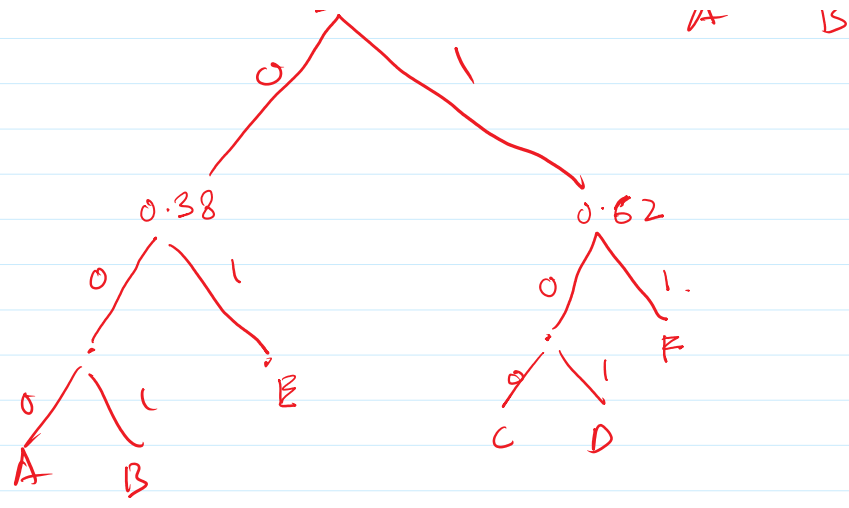
A = 0 0 0
B = 1 0 0
C = 0 0 1.
D = 1 0 1.
E = 10
F = 11.