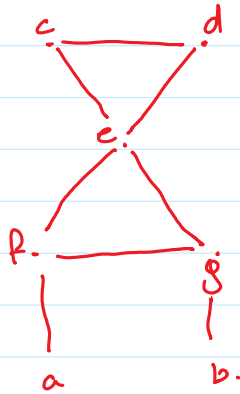


lec # 23:-

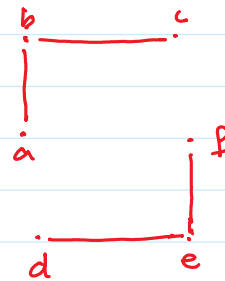
Connectivity.

Connected Graph:- if \exists a path between Every pair of distinct Vertices.

Ex 6 :-
PS 63

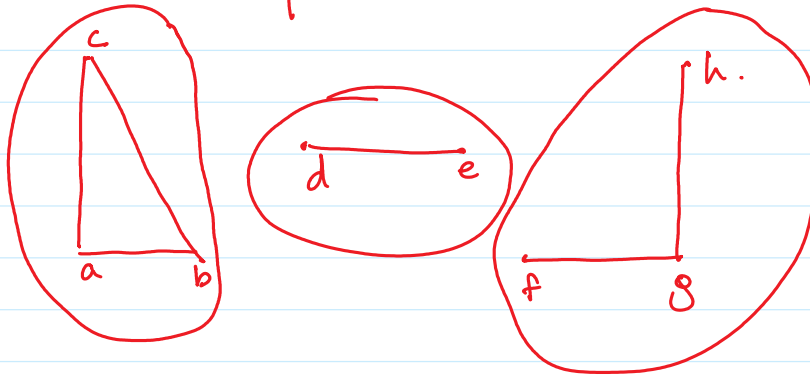


Connected



Not Connected.

Connected Component.



Cut Vertices:-

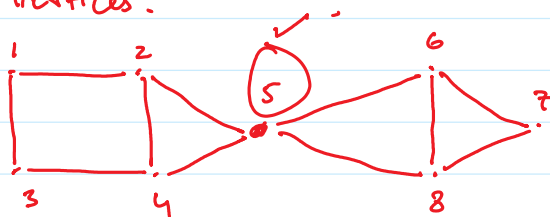
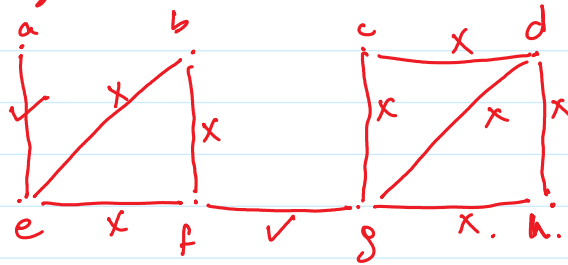


Fig 5
564.

Cut Edge:-

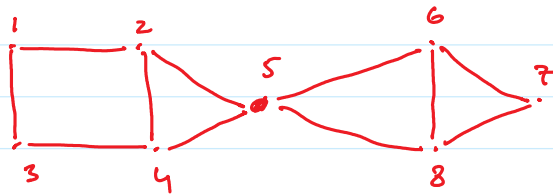
a b c x d

Cut Edge:-



Cut Set:-

$\{(2,5), (4,5)\}$ ✓

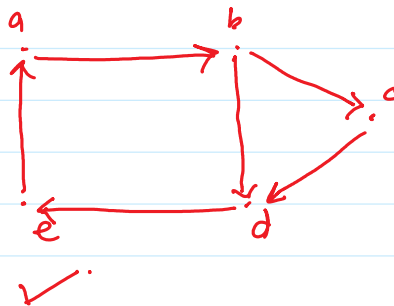


Directed Graph.

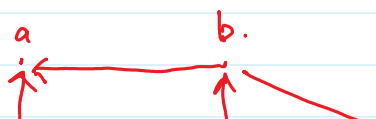
Strongly Connected:- if \exists a path from 'a' to 'b' \wedge 'b' to 'a' where $\forall a, b \in V$ in a Graph $G_2(V, E)$.

Weakly Connected:- if \exists a path from 'a' to 'b' \vee 'b' to 'a' where $\forall a, b \in V$ in a Graph $G_2(V, E)$.

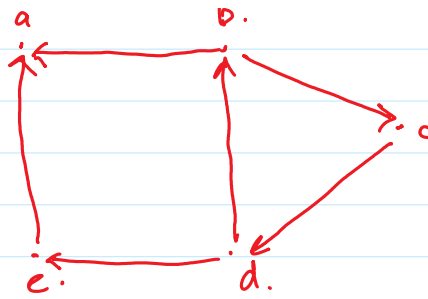
Ex 11 :-
PS 65



a to b \wedge b to a.
a to c \wedge c to a.
a to d \wedge d to a.
a to e \wedge e to a.
b to c \wedge c to b.
b to d \wedge d to b.
b to e \wedge e to b.
c to d \wedge d to c.
c to e \wedge e to c.
d to e \wedge e to d.

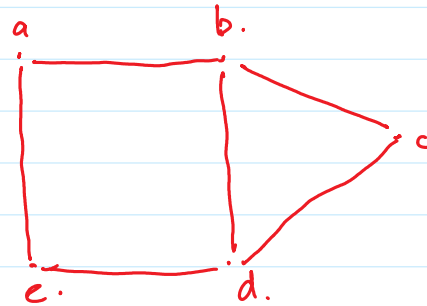


a to b \vee b to a.



a to b \vee b to a.

alternative way to check weakly Connected.

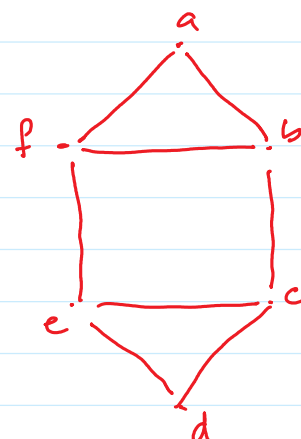
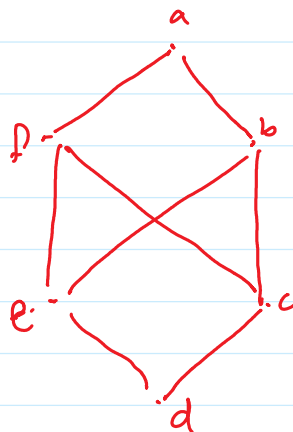


weakly Connected if Undirected graph has 1 Connected Component.

(Isomorphism .

1. Vertices.
2. Edges.
3. Degrees.
4. Adj degrees.
5. Cut Vertices.
6. Cut Edges.
7. Circuits.
8. Assignment.
9. Incidence Matrix.

Ex 15
566



\sqrt{d}

Circuit of $\deg(2) = 0$
 $11 \quad 11 \quad 1(5) = 0$

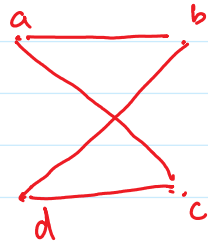
\sqrt{d}

Circuit of $\deg(2) = 0$
 $1 \quad 1 \quad 1(5) = 2$

X.

Ex 16

Number of Distinct path b/w Vertices.



$$A^1 = \begin{matrix} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix} \end{matrix}$$

ababa
 acaca
 abdba
 abdca
 abaca
 acdca
 acdba
 acaba

$$A^4 = \begin{matrix} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 8 & 0 & 0 & 8 \\ 0 & 8 & 8 & 0 \\ 0 & 8 & 8 & 0 \\ 8 & 0 & 0 & 8 \end{bmatrix} \end{matrix}$$


Cut Vertex
 Cut Edge.