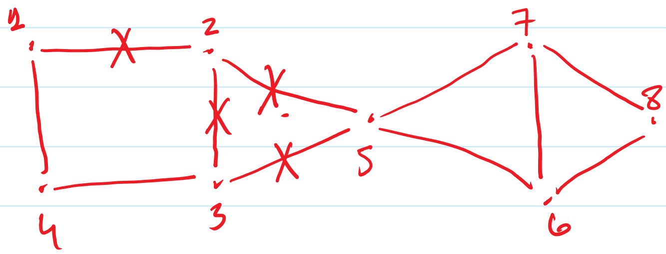
lecture 26:-

Cut Set:- In a Connected Graph G, a cut set is a set of edges whose removal from G, leaves G disconnected. provided removal of no proper subset of these edges disconnects G.



Ex 9:- $\{(2,5), (3,5)\}$? ✓

$\{(1,2), (2,3), (3,5)\}$? ✓

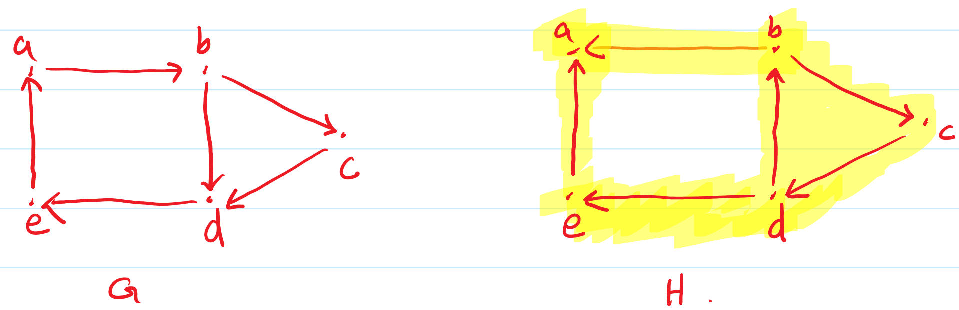
$\{(1,2)\ (2,3), (3,5), (2,5)\}$? X.

Connectedness in directed Graphs.

Strongly Connected:- A Graph $G=(V,E)$ is Strongly Connected. if $\forall a,b \in V$. $\exists$ a path from "a" to "b" & also "b" to "a".

Weakly Connected:- A Graph $G=(V,E)$ is weakly connected if $\forall a,b \in V$ $\exists$ a path from "a" to "b" OR "b" to "a".

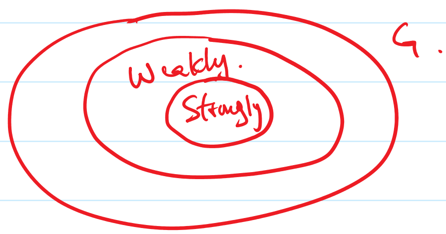
Ex 11 :-
564



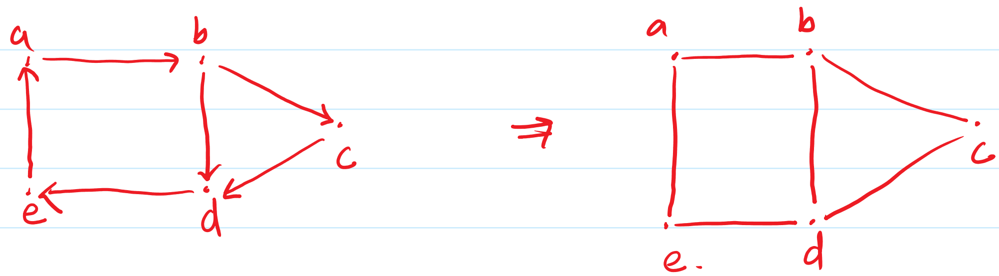
a to b. ✓	b to a ✓	b to c ✓	c to b ✓
a to c ✓	c to a ✓	b to d ✓	d to b ✓
a to d ✓	d to a ✓	b to e ✓	e to b ✓

a to d ✓   d to a ✓   b to c ✓   e to b ✓
a to e ✓   e to a.

c to d ✓   d to c ✓   d to e ✓   e to d ✓
c to e ✓   e to c ✓

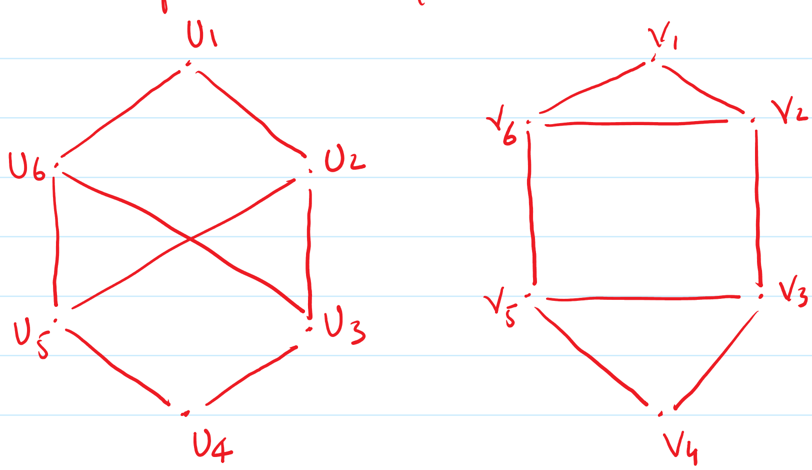


Second method for checking Weakly Connected.



step 1: find the Corresponding Undirected Graph.
step 2: if Connected → weakly Connected.

Isomorphism & Paths.



G   H.

SC of length = 3 = 0 $\neq$ SC of lengths = 2.

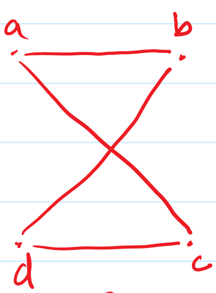
Checking Isomorphism.

1- Edges.
2- Vertices.
3- Degrees.
4- Adjacent.
5- Cut Vertices.
6- Cut Edges.
7- Simple Circuits of $3 \leq$ length $\leq n$.
8- Assign.
9- By making Incidence matrix.

Counting Paths:-

EX 6 :-
567

$$A^2 = \begin{array}{c|cccc} & a & b & c & d \\ \hline a & 0 & 1 & 1 & 0 \\ b & 1 & 0 & 0 & 1 \\ c & 1 & 0 & 0 & 1 \\ d & 0 & 1 & 1 & 0 \end{array}$$

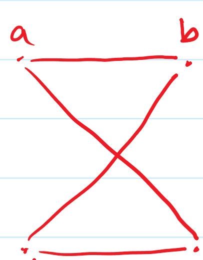


G.

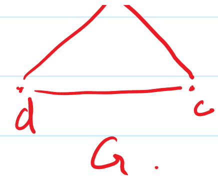
$$A^4 = \begin{array}{c|cccc} & a & & & \\ \hline a & 8 & 0 & 0 & 8 \\ & 0 & 8 & 8 & 0 \\ & 0 & 8 & 8 & 0 \\ & 8 & 0 & 0 & 8 \end{array}$$

a to a.

1 ababa
2 acaca
3 abdba

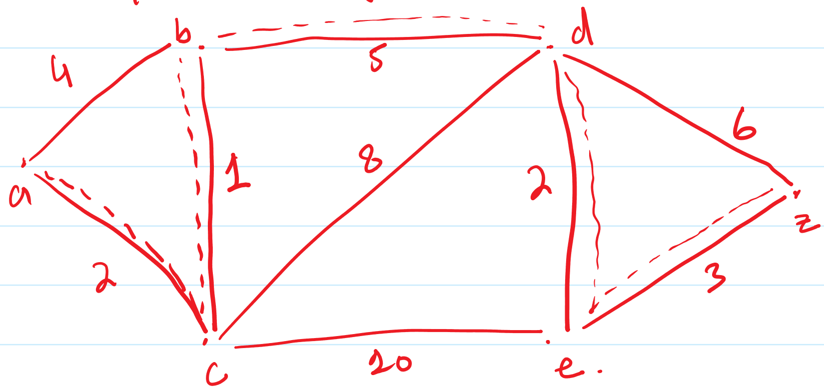


3 abdba
4 abdca.
5 abaca
6 acdca
7 acdba
8 acaba.



Ex 567 - 570. (HW).

Shortest path (Dijkstra Algorithm).



a to z shortest path.

	a	b	c	d	e	z
a	$\boxed{0a}$	4a	$\boxed{2a}$	∞	∞	∞
c	$\boxed{0a}$	$\boxed{3c}$	$\boxed{2a}$	10c	12c	∞
b	$\boxed{0a}$	$\boxed{3c}$	$\boxed{2a}$	$\boxed{8b}$	12c	∞.
d	$\boxed{0a}$	$\boxed{3c}$	$\boxed{2a}$	$\boxed{8b}$	$\boxed{10d}$	14d
e	$\boxed{0a}$	$\boxed{3c}$	$\boxed{2a}$	$\boxed{8b}$	$\boxed{10d}$	$\boxed{13e}$
z	"	"	"	"	"	".

a to z.
path length = 13.

acbdez

HW find path length btw e to a.

length.