28/11/22

FINAL TERM STARTED

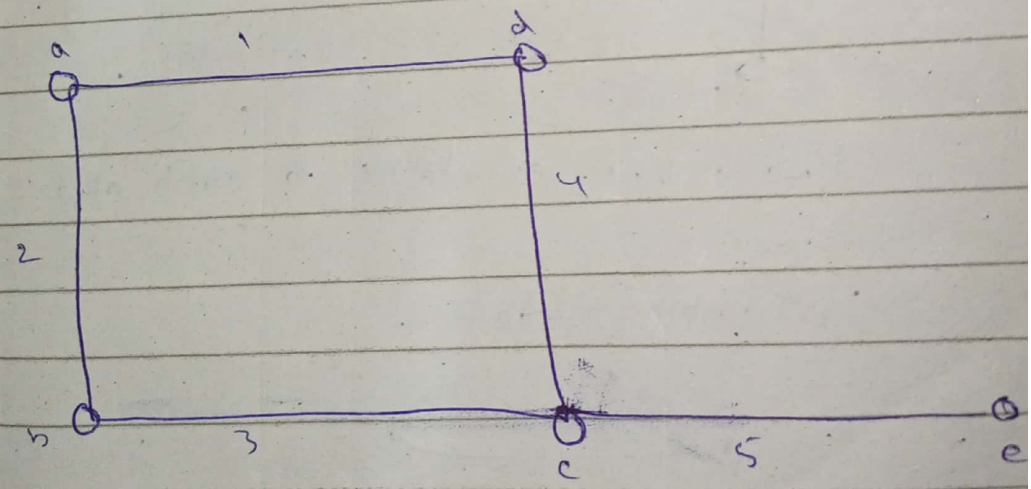
Graph Theory

Google map (exapl)

Adjacent vertex
Adjacent edge
Self loop
Multi edges
Pseudo graph
(SL, ME)
Multi graph
Simple graph

Edge - path
vertex - node

Handshaking lemma



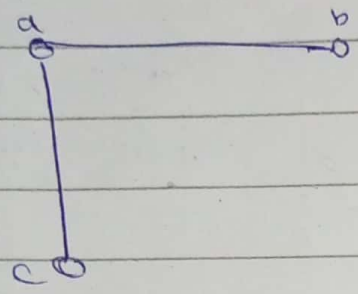
$\sum d(v) = 2 * |E|$

Edges (1, 2, 3, 4, 5)

vertex (a, b, c, d, e)

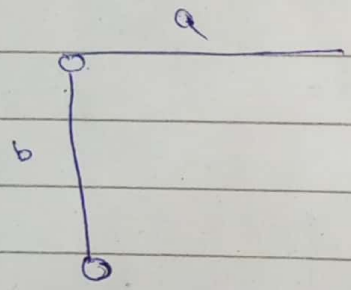
Date

Adjacent vertex



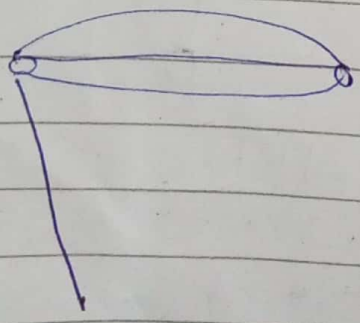
Two vertex combine to each other

Adjacent edge



Two line combine to each other

Multi edge



Four line to out of vertex.

RC

Date

Graph Theory.

Varying Application (examples)

* Computer Networks.
* Distinguish b/w two chemical compounds with the same molecular formula but different structure.
* Solve shortest path problem b/w cities.
* Scheduling exam and assign channels to television stations.

Graph.

A generalization of the simple concept of a set of dots, links, edges or arcs.

Representation.

$G = (V, E) = V(G), E(G)$

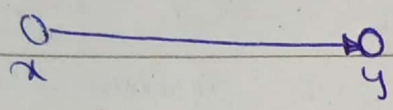
G = Graph
V = Vertex
E = Edges

Date

Two types of Edges

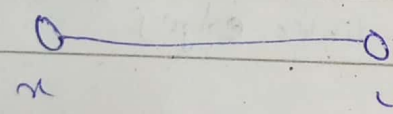
1) Directed Edge
2) Undirected Edge

1) Directed Edge



It is a represented as (x,y) directed from vertex x to y

2) Undirected Edge



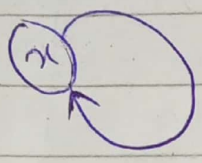
It is a represented as (x,y). but I don't know that which initial point or terminating point both vertices interchangeably.

Date

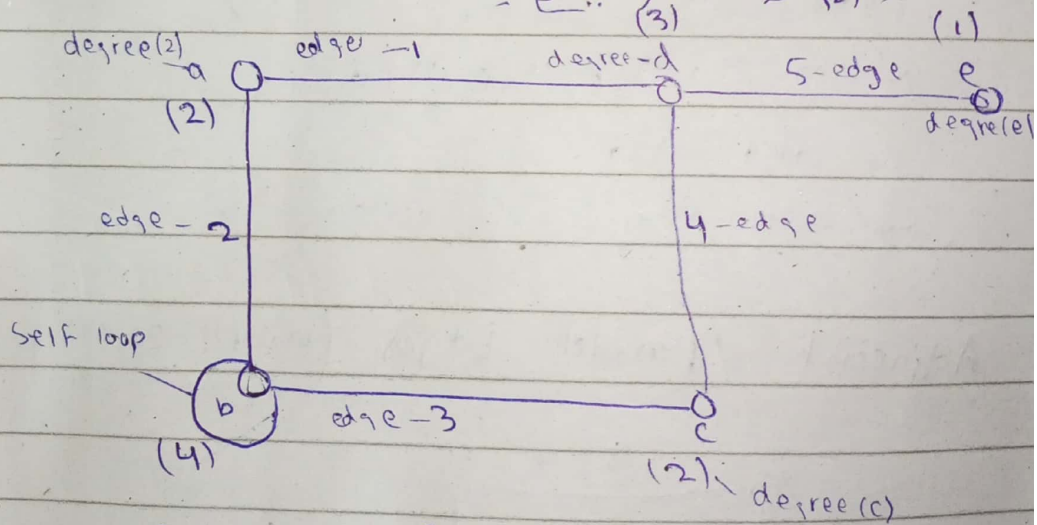
- Loop → Self Loop

A loop is an edge whose endpoints are equal i.e an edge joining a vertex to it self is called loop.

example (x, x) = (x) → represented



جب ہم degree یعنی vertex کو count کرتے ہیں تو ہر edges 2 count کرینگے لیکن جب loop ہوگا تو count کرینگے ایک (1) count کرتے ہیں تو ہر ایک Loop کو vertex سے جتنی بھی path نکلے اگر loop ہوگا تو وہ (2) کو add کرینگے۔



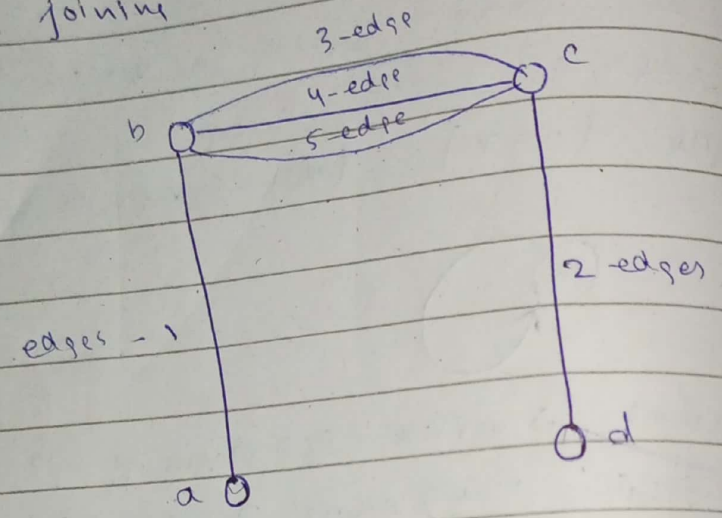
Edges = 5

Vertex = 12

Date

Multi Edges

Two or more edges joining the same pair of vertices



Edges = 5

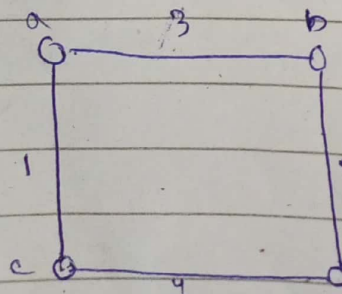
vertex : a=1, b=4, c=4, d=1

$\sum d(v) = 10$

Summation degree of vertex . = 10

Adjacent / Parellel Edges

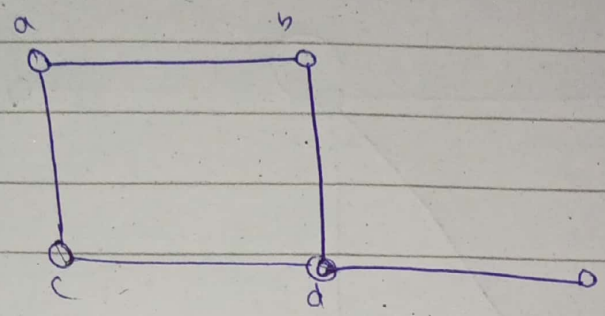
(multiple = parell
same none



1 & 2 = parell edge & 1 & 3 Adjacent edge

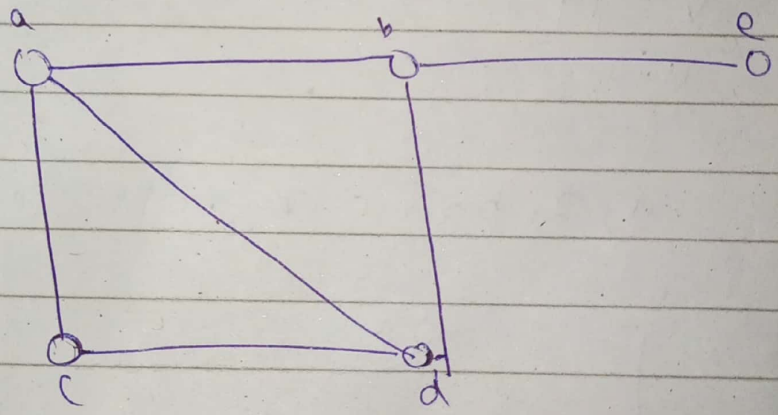
Date

Simple Graph



Vertex. a to b -> adjacent vertex

Multi Graph

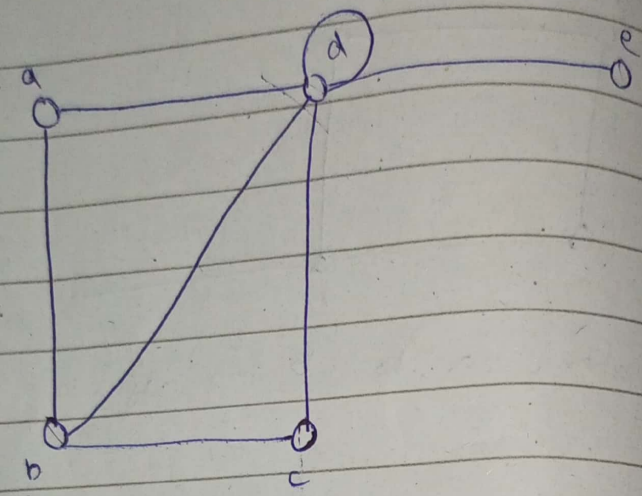


Vertex a to d

This is a Multi graph identify

Pseudograph

Combined self loop and multi edges is called Pseudo

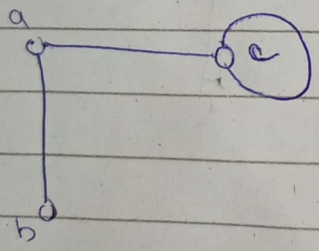


E = 6

V = 14

How

a = 2, b = 3, c = 2, d = 4+2, e 1



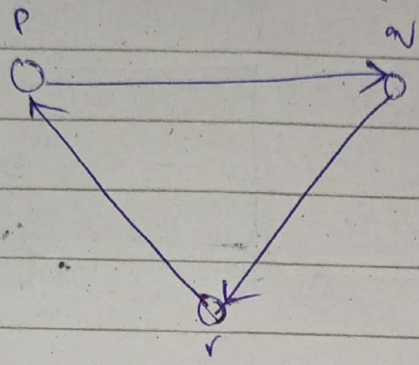
E = 3

V = 6

اگر آخری vertex میں loop لگ جائے تو اس میں edges 2 count کریں گے۔

Date

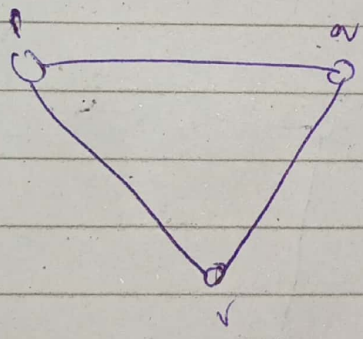
Directed Graph (ordered pair)



$G(V) = \{p, q, r\}$

$G(E) = \{(p, q), (q, r), (r, p)\}$

Undirected Graph (unordered pair)

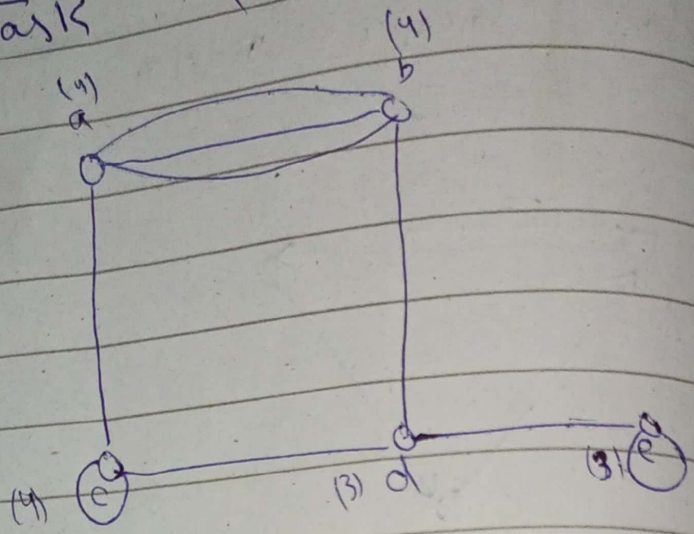


$G(V) = \{p, q, r\}$

$G(E) = \{(p, q), (q, r), (p, r)\}$

Date

Task (1)

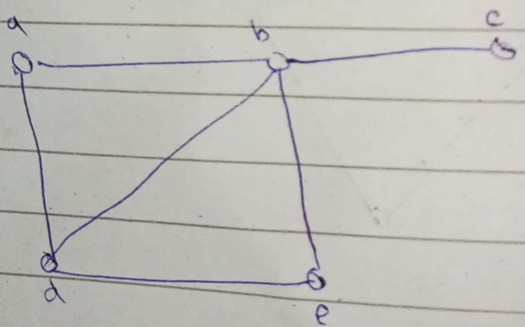


$$\sum d(v) = 2 * |E|$$

$$18 = 2 * 9$$

$$18 = 18$$

Task 2

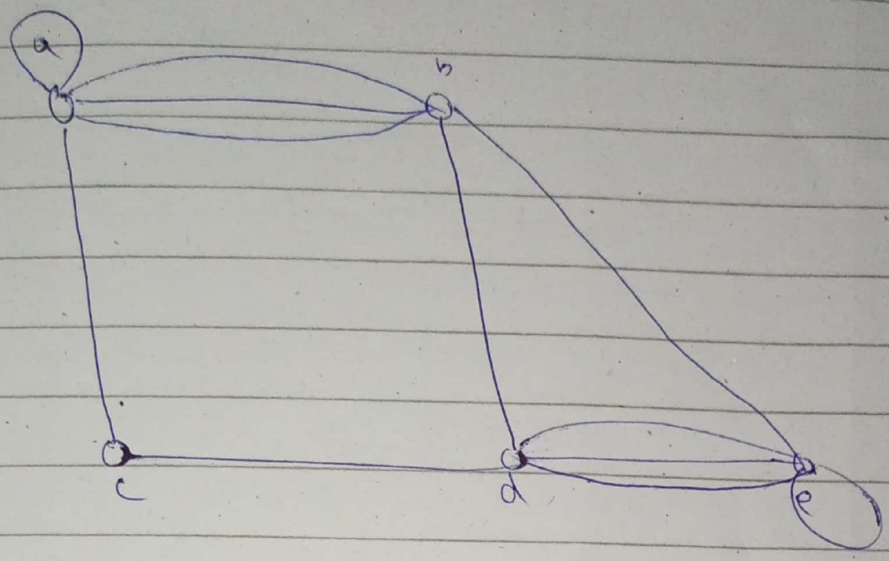


$$12 = 2 * 6$$

$$12 = 12$$

Date

Task 3



degree

a = 4+2, b = 5, c = 2, d = 5, e = 4+2

$\Sigma d(v) = 24$

Edges

12

Now

$\Sigma d(v) = 2 * |E|$

$24 = 2 * 12$

$24 = 24$