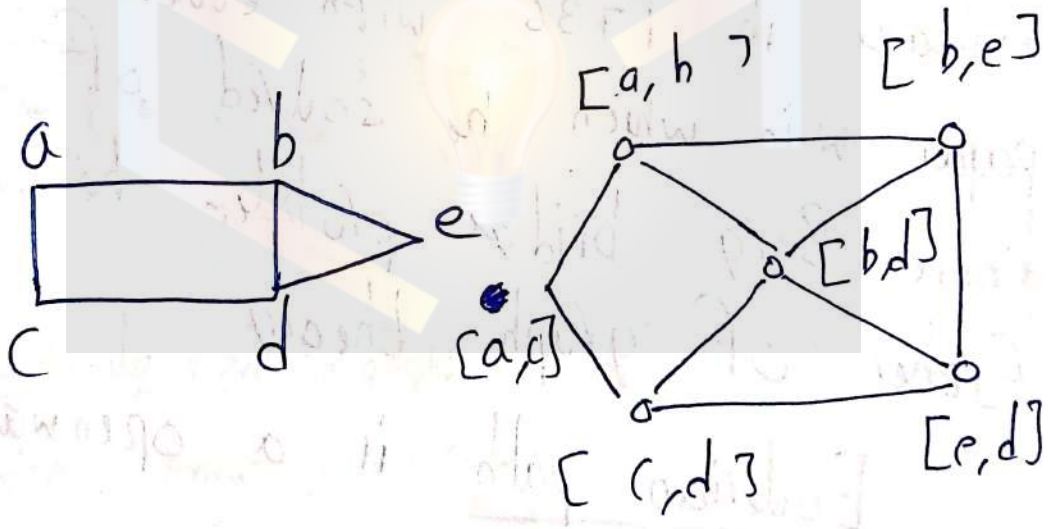
Unit-2

Special classes of graphs:-

i) Bipartite graph
ii) line graph
iii) chordal graph

line graph L G of G written L(G) is the simple graph whose vertices are the edges of G with

ef ∈ E(L(G)) where e & f are have a common endpoints in G.



Chordal graph is a simple graph in which every graph cycle of length 4 & greater has a cycle Chord

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which is an edge that is not part of cycle but connects 2 vertices of cycle

Choltal graph are subset of perfect or complete graphs.



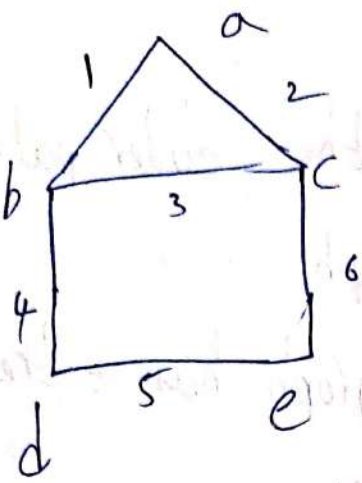
Euclerian graph:-

Graph theory came in existance in 1736 with euler's paper w in which he solved of konics Berg bridge problem he is father of graph theory

Euclerian path is a openwalk with all edges

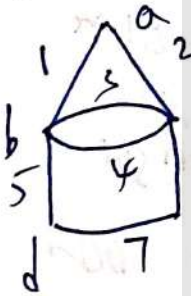
A graph is said Unicursal if it has euclerian path.

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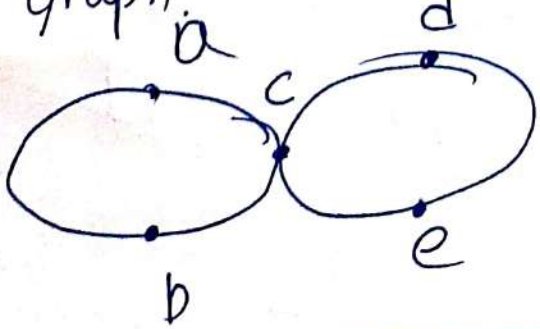
b 1 a 2 c 3
b 4 d 5 e 6 c

Eulerian circuit is a closed walk with all edges a graph contain eulerian circuit is called Eulerian graph



→ a 1 b 5 d 7 e 6 c 4 b 3 c 2 g

Randomly eulerian graph: If all vertices degree is even that is called ranomly eulerian graph.



abcdeca

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Application

Fleary's algorithm:

It displays the euler path, or circuit for a graph

i) makesure that graph has either 0 or 2 odd vertices

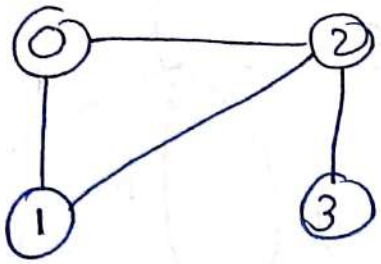
ii) If their are 0 odd vertices start anywhere

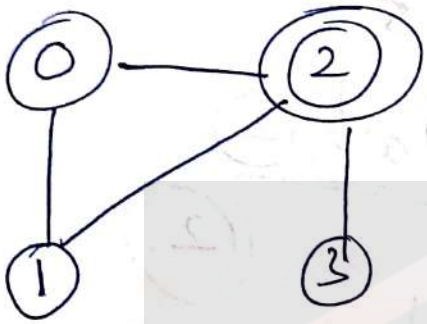
if their are 2 odd vert start anyone of them

iii) follow edge 1 at a time if you have choice b/n a bridge & non bridge always choose non bridge.

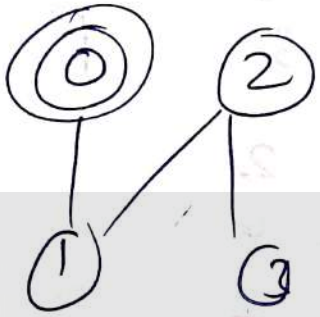
iv) Stop when you run out of edge

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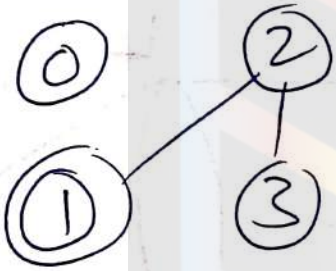




2-0

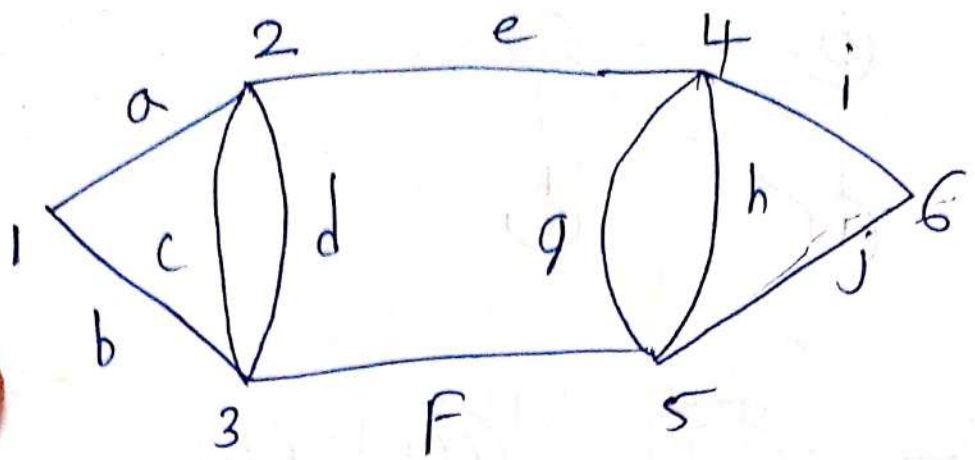


2-0 0-1



2-0 0-1 1-2

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d(1) = 2

2 = 4

3 = 4

4

5

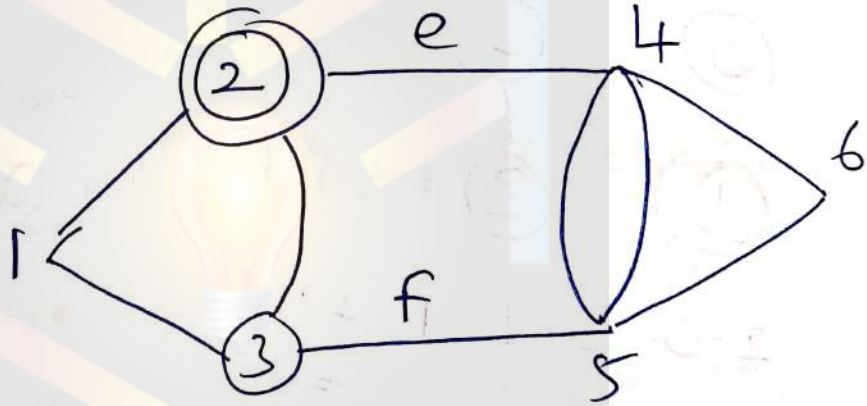
6

—

stalk ②

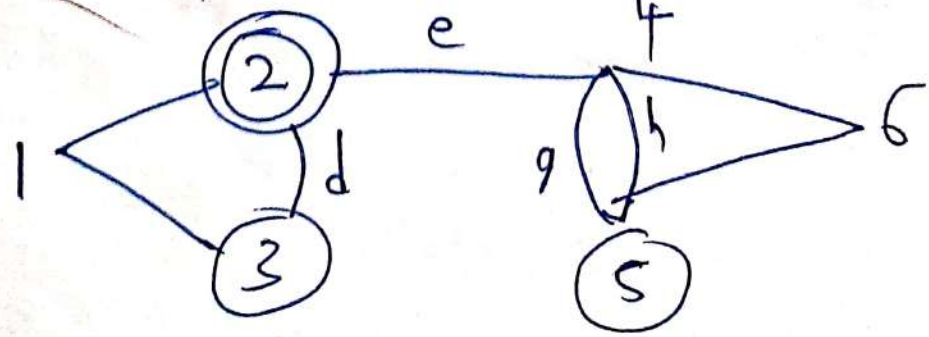


del remove c



② — c

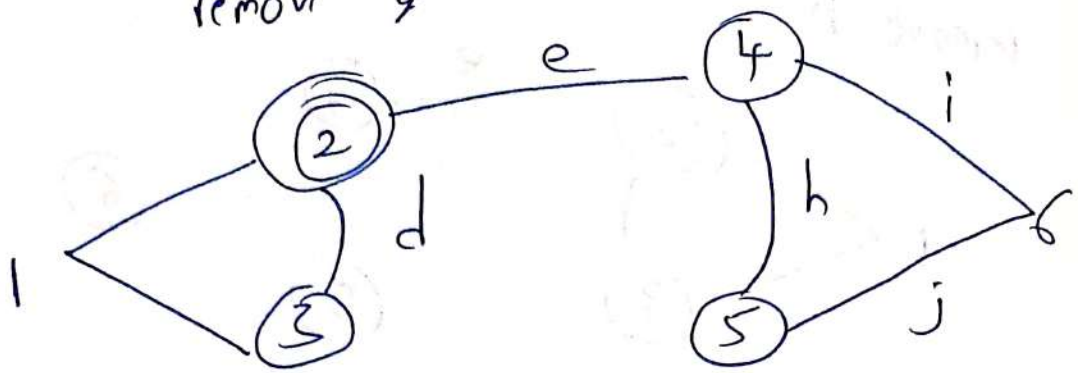
remove f



③ — f

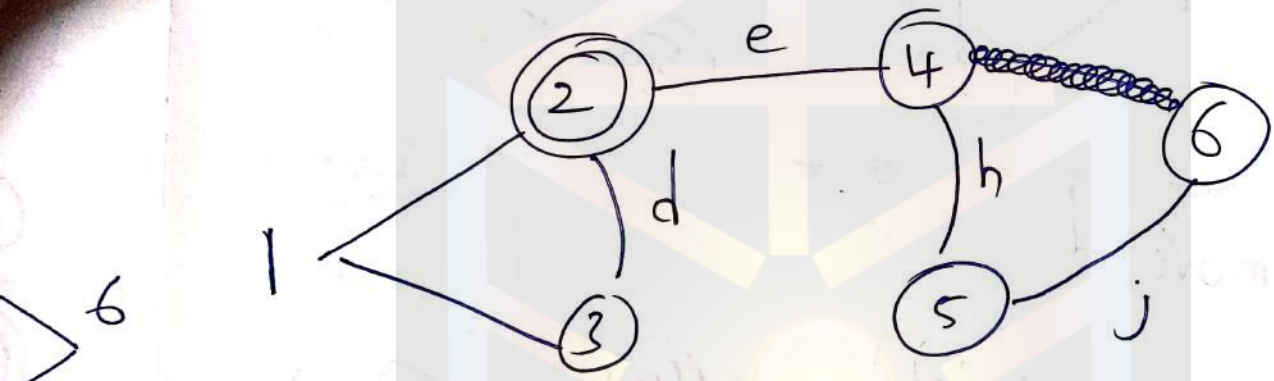
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remove g



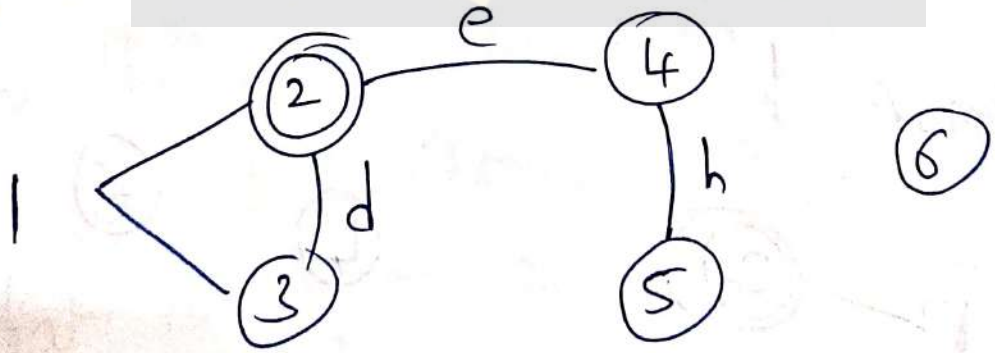
(4) - g

remove i



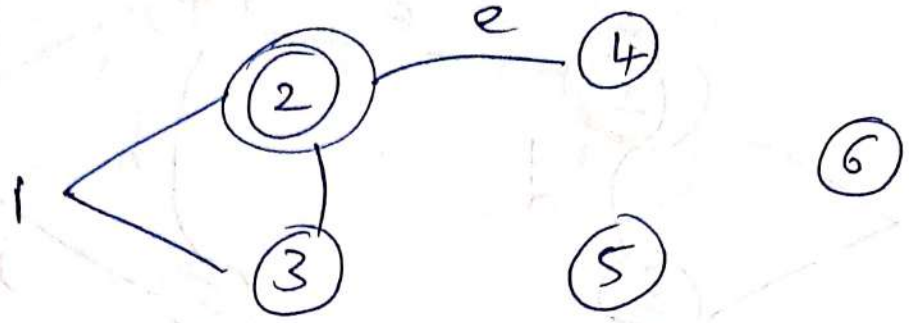
(4) - i

remove j



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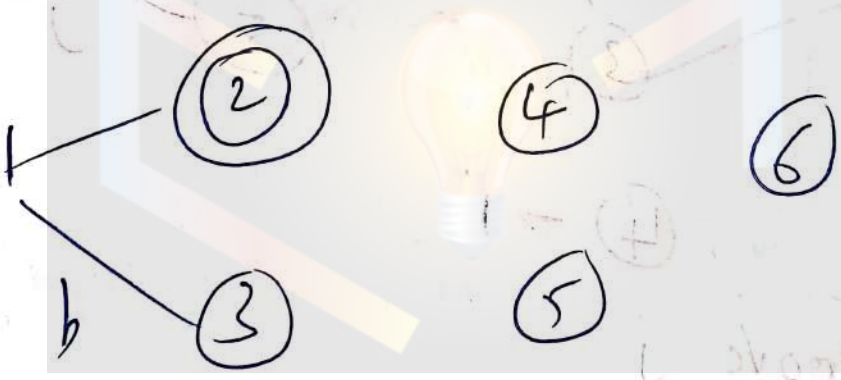
remove h



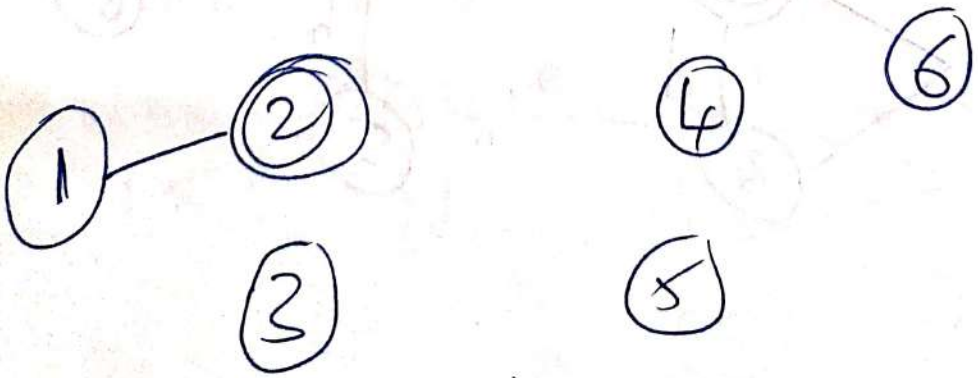
remove e



remove d

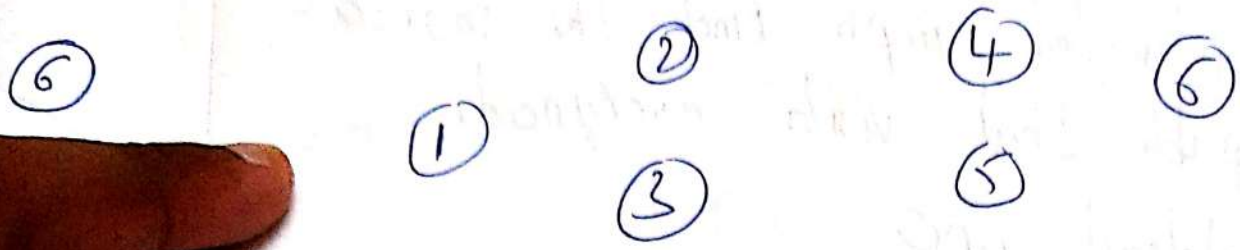


remove b



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remove a



~~2 — 3 — 5~~

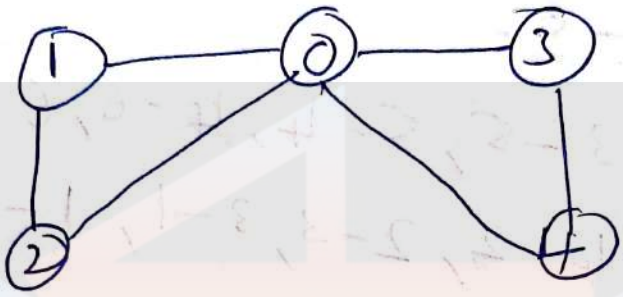
2-3, 3-5, 5-4, 4-6, 6-5,
5-4, 4-2, 2-3, 3-1, 1-2

Chines poitmen probl

Chine mathamatician kuan proposed thi problem a poitman receive the mail from poit office & delivers them & then return to the poit office. Poitman work to select a rute in such a way that he must travel all th streets atleast once & he travel as deil as possible.

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It is for connected undirected graph find the shortest path that visits every node atleast once



2 1 0 3 4 ~~3~~ 0 2 path.

all vertices degree is even

Steps:

i) if the graph is eulerian return sum of all edges weights else do following steps

ii) We find all vertices with ~~even~~ odd degree

iii) List all possible pairing of odd vertices for n odd vertices
Total no. of pairing possible are
$(n-1) * (n-3) * (n-5) * \ldots 1$

iv) Find each set of pairing Find the shortest path connecting them

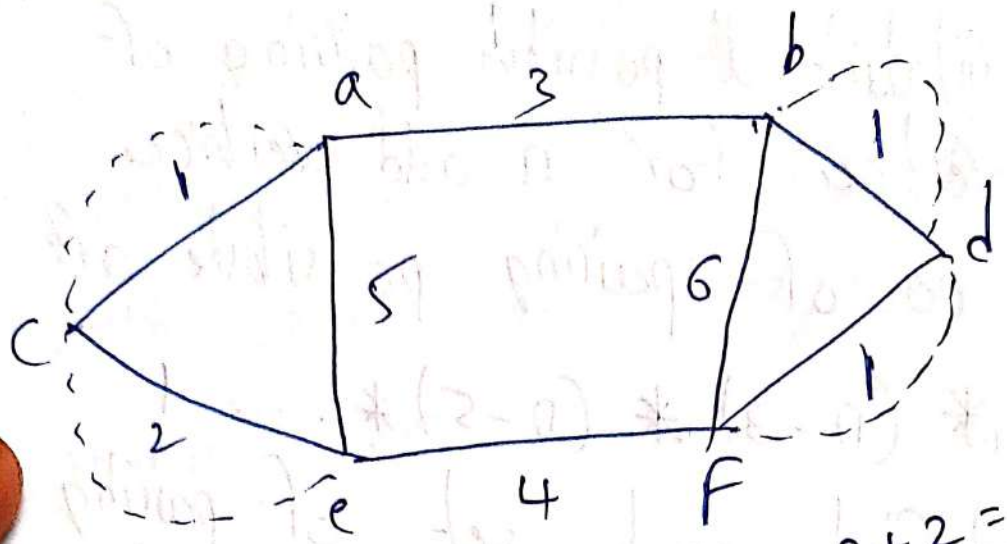
v) Find the pairing with minimum shortest path connecting pair

vi) Modify graph by adding all edges that have been found in step 5

vii) Weight of Chines postman tour is sum of all edges in modified graph

viii) Print Euler circuit of modified graph
i.e, chines postman tour

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$23 + 3 + 2 = 28$ //

d(a) = 3 ✓
d(b) = 3 ✓
d(c) = 2 ✗
d(d) = 2 ✗
d(e) = 3 ✓
d(F) = 3 ✓

✓ odd
✗ even

{a, b, e, f} combination

{{a, b}{e, F}} ✗

{{a, e}{b, f}} ✓

{{a, f}{b, c}} ✗

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{a, c} – a b c & c b e

5 1 + 2 = 3

{b, F} – b b d & d b F

6 1 + 1 = 2

a – b – d – F – d – b – F – e – C – a

– C – e – a

23 + 3 + 2 = 28

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