

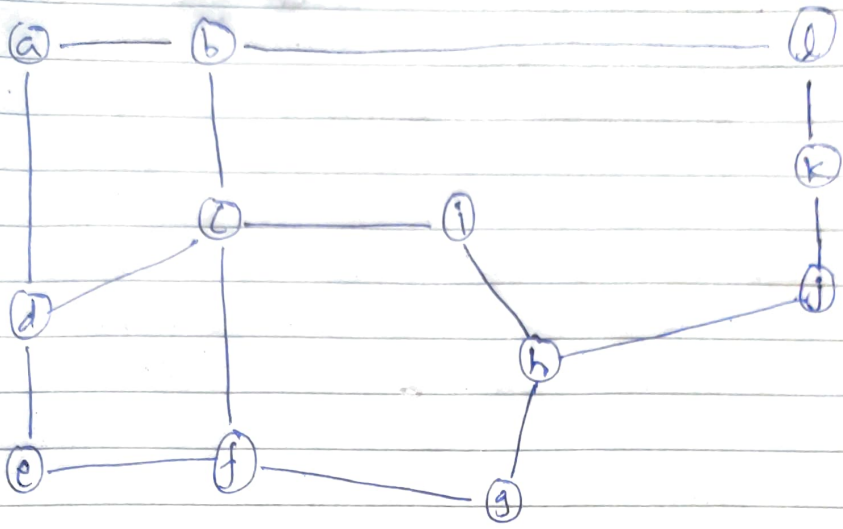
Homework 2

Page No.

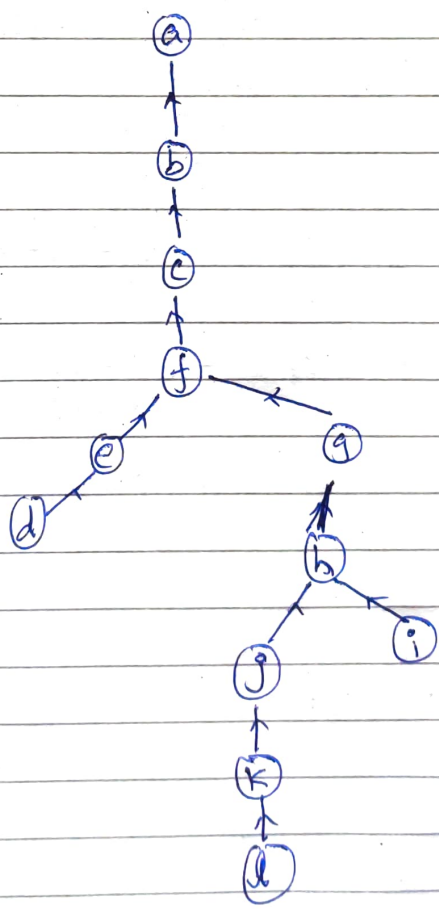
Date

1

12 vertices 18 edge biconnected graph



DFS tree



v	a	b	c	d	e	f	g	h	i	j	k	l
DFS#	1	2	3	6	5	4	7	8	12	9	10	11

- With Tarjan - Schmidt we check for biconnectedness of graph
- Ear decomposition is byproduct.

Algorithm:

- edges are directed towards root in DFS tree.
- each vertex is given number according to DFS visit order.

- Set flag for each vertex as {visited, not visited}
- Start with non tree edges of vertex v with the lowest DFS#
- Trace the cycle induced by the non tree edge but stop on encountering a vertex with flag visited.

Start with edge ad

- Trace cycle $ad-de-cf-fc-cb-ba$
 call resulting cycle as P_1
 P_1 : ad - de - cf - fc - cb - ba

Visited vertices : a, d, e, f, c, b

- For the edge bd

Resulting edge path contains:

P_2 : bd - dk - kj - jh - hg - gf

Since f is already visited, stop here.

Vertices d, k, j, h, g are added to visited.

③ For the edge cd
 $P_3 : \underline{cd}$

Stop here since d is visited.

No extra vertices added to visited list.

④ For edge ci
 $P_4 : \underline{ci} - ih$

Stop at h since h is already visited.

'i' is added to visited vertex list.

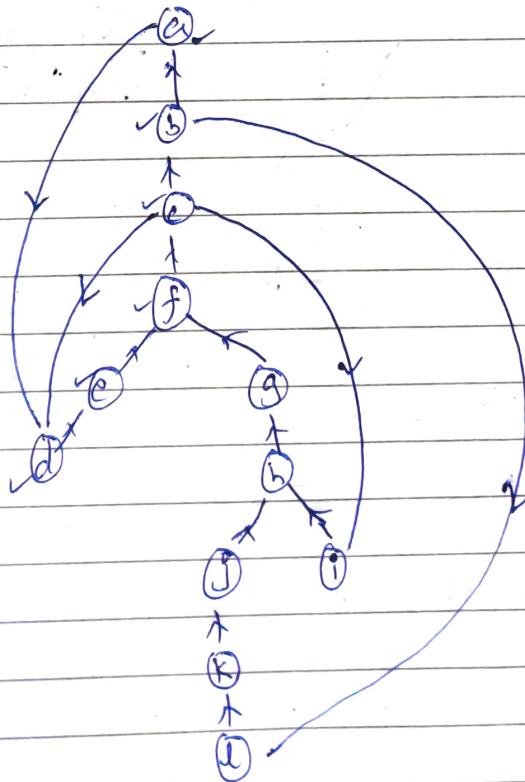
$\therefore P_1 : ad - de - ef - fc - cb - ba$

$P_2 : be - ek - kj - jh - hg - gf$

$P_3 : cd$

$P_4 : ci - ih$

(Though P_1 can be decomposed in P_0 & P_1 \rightarrow now all ears are open ears)



(✓: All vertices are visited at end)

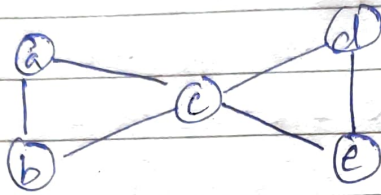
Total ears : $m - n + 1$
 $15 - 12 + 1 = 4$ verified.

Since all the

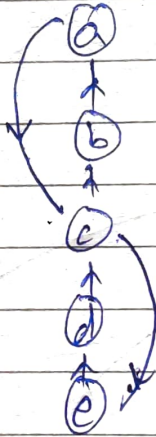
if graph is 2-edge connected it may/may not be 2-vertex connected.

But if graph is 2-vertex-connected implies graph is 2-edge connected.

- If Input is not biconnected. (took 2 edge connected)



DFS :



V _k	a	b	c	d	e
DFS#	1	2	3	4	5

P1: ac - eb - ba

P2: ce - ed - dc

Since P2 is closed ear, which was supposed to be open ear according to Tar-Schmidt for P2, P3...
Algorithm fails here.